THE

AMERICAN JOURNAL OF PHARMACY.

SEPTEMBER, 1864.

PERMANGANATE OF POTASSA.

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During the past few years Permanganate of Potassa has been steadily acquiring importance as a therapeutic agent, and the number of its useful applications has so extended as to gain for it admission into both our own and the British Pharmacopœia.

Since May, 1863, however, it has acquired a new importance, from its application to the treatment of Hospital Gangrene; and, within the past four months, the demand for it by the Government for the Army Hospitals, could not be supplied, although application has been made to most, if not to all the prominent manufacturing chemists of the country.

Prof. Samuel Jackson, of Philadelphia, (see *Amer. Journ. Med. Sciences*, for January, 1864, p. 98, *et. seq.*,) in search for new applications for this salt, suggested its use in gangrenous wounds, to his friend, Dr. F. Hinkle, formerly of Marietta, Pa., but then an Acting Assistant Surgeon in the army, on duty at the Campbell General Hospital, Washington. Dr. Hinkle adopted the suggestion, and first applied it to the treatment of Hospital Gangrene, in May, 1863, with success. Subsequently he extended its application to the same disease in the Jarvis General Hospital, Baltimore, under charge of Surgeon De Witt C. Peters, U. S. A., and published the results in the *Amer. Med. Times*, Vol. VII., Nos. XXII and XXIII., pp. 254 and 265. The results obtained in this hospital are endorsed by Surgeon Peters, in a letter to the editor of the *Amer. Med. Times*, Vol. VII., No. XXIII., p. 266, and were deemed of

sufficient importance to authorize its extended application in the Army Hospitals, by the Surgeon General, hence the demand, which as yet, has not been fully supplied.

The reason for this deficiency in supply is, probably, the troublesome, laborious, wasteful, uncertain and expensive processes which have been published and adopted for producing it. The U. S. Pharmacopœia places the salt in the Primary List of the Materia Medica, to be obtained from the manufacturing chemist, giving no process for it. The British Pharmacopœia gives a bad modification of the process of Gregory, which yields it in very small proportion, liable to contamination with sulphate of potassa, chloride of potassium and free potassa, and by a very troublesome and tedious manipulation. The best published process is, probably, that of M. Béchamp, of Montpellier, France, which is an improvement upon the original method of MM. L'Hermite and Personne. It is briefly, as follows:—Ten parts of binoxide of manganese in fine powder, and twelve parts of fused hydrate of potassa dissolved in a small quantity of water, are intimately mixed, and then thoroughly dried. This mixture is placed in an earthen-ware retort, the tubulure of which is furnished with a tube, which passes to near the bottom of the retort. To the beak of the retort, when placed in a furnace, a bent tube is adapted and the end of this dips into mercury. The retort is heated, and then a current of oxygen, or air deprived of carbonic acid, is passed into it through the tube in the tubulure until absorption ceases. The mass is then exhausted with hot water, and through this solution carbonic acid is passed, until the solution acquires the proper red or purple color, when it is allowed to settle. It is then decanted and concentrated, without boiling, until crystals begin to form. The crystals which separate on cooling are recrystallized. The product is about 35 per cent. of the weight of oxide used. The peculiarities of this method, which is not so well known as that of Gregory, are first, that oxygen obtained in a separate process, is passed through the heated mixture of binoxide of manganese and hydrate of potassa, until it ceases to be absorbed; and second, the saturation of the free potassa, which must be used in excess, by carbonic acid. This method, well managed, gives a very large yield of a very pure

salt; but it is extremely complicated, troublesome and expensive, and only available upon a very small scale, or a scale so very large as to admit of an expensive special apparatus.

The process of Gregory sometimes unaccountably fails altogether, even with excellent binoxide of manganese; and, at best, yields a small product, from the difficulty of separating the chloride of potassium from the final solution. It is as follows:—Eight parts of binoxide of manganese and seven parts of chlorate of potassa are powdered together, and mixed with a solution of ten parts of hydrate of potassa in a very small quantity of water. This mixture is dried, heated, and rubbed to powder, and then ignited in a crucible, until the chlorate of potassa is thoroughly decomposed. The mass is then boiled in a large quantity of water, and allowed to settle. The clear solution is then decanted, and evaporated until it will crystallize on cooling. The crystals are redissolved and recrystallized. The oxidation is here obtained from the chlorate of potassa, but the resulting chloride of potassium remains to crystallize from the solution with the permanganate. The British Pharmacopœia modifies this process, and saturates the free potassa with sulphuric acid, thus complicating the process, and yielding sulphate of potassa.

These processes alone, so far as the writer knows, have been relied upon by manufacturing chemists generally, and their uncertainty and insufficiency have been the cause of much trouble and delay, and of an inadequate supply, through which suffering may have been prolonged and, possibly, lives lost.

Under these circumstances, the writer, two months ago, determined to devote his time and attention, as far as possible, to some efforts at improving a process for the preparation, and believes he has succeeded sufficiently to warrant the publication of his results, though they have not, as yet, been practically applied on any larger scale than that now to be described; and it is hoped that other manufacturers will take up the method, and improve it to their own interests and those of humanity.

An experience of some years in preparing this salt on a small scale, had led the writer to conclude that the laws of combining proportions were not to be relied upon in the formation of the salt, and that the trials with it must be mainly empirical.

This rendered the subject a tedious and laborious one, and naturally detracts somewhat from that confidence which the results might otherwise claim, since these now are strictly applicable only to the particular parcel or lot of binoxide of manganese used in the experiments.

Besides the experience of some years just alluded to, the basis of these experiments and researches was, first, the fact recorded by Chevillot and Edwards, that binoxide of manganese ignited with hydrate of potassa, produced *some* manganate of potassa; second, that sesquioxide of manganese, reduced from binoxide at a red heat, was again converted into binoxide, if subjected to the action of steam at a temperature somewhat below redness; and third, that the formation of other crystallizable salts in the solution of the permanganate must be avoided.

It was first ascertained by experiment that an intimate mixture of binoxide of manganese and hydrate of potassa, gave a larger proportion of manganate of potassa, when heated only to a temperature very much below redness, than when ignited; and it was next ascertained that the application of steam to the mixture, when thus moderately heated, increased the proportion both of manganate and permanganate; and the prime object then became, to push this oxidizing process as far as possible, and to simplify its application. It was next found that repeated applications of steam, more than prolonged application, favored the desired result, and this, and a desire to simplify, led directly to the intermittent application of water to the heated mass, instead of steam, and the result was found to be better and far more easily obtained. Béchamp had avoided crystallizable salts by supplying oxygen to the mixture from without, provided his process was so managed that the carbonic acid was not in sufficient quantity to produce any bicarbonate; but it seemed better and more simple, as well as more economical, to separate the excess of potassa without combining it, and then to reserve it for farther use.

This brief outline of the expenditure of much time, labor, and trouble, may serve to introduce the process proposed, as modified by these results, and as practised many times upon the scale given, with tolerably uniform results.

The binoxide of manganese used was imported from Saxony,

or known in the market as Saxony Manganese, and contained 71·63 per cent. of pure binoxide, by Fresenius and Will's method of assay. The hydrate of potassa used was the common caustic potassa of commerce, sometimes in sticks, and sometimes simply fused in lumps.

Take of Binoxide of Manganese, containing not less than 70 per cent of the oxide, and in fine powder, six pounds, avoirdupois.

Fused Hydrate of Potassa, four pounds.

Distilled Water, a sufficient quantity.

Put two pounds of the potassa, and four fluid ounces of distilled water into a shallow cast iron basin of two gallons capacity, and place this over a furnace-fire sufficiently brisk to heat the bottom of the basin nearly red hot. When the potassa is dissolved, add to the solution two pounds of the binoxide of manganese and stir the mixture constantly until it is dry. Then rub it to powder in the basin with an iron pestle, and heat it thoroughly, but short of redness. While hot, pour upon it in a small stream a pint of distilled water, and so manage this that the whole of the powder may be moistened as quickly as possible. Stir the mixture thoroughly and constantly until it is again dry, and then occasionally until it is again heated as before. Then asperse it again with a pint and a half of distilled water, and stir and heat the mixture as before. Repeat this heating and aspersion with one and a half pints of distilled water again twice, making four times in all, and then having heated the mixture, add one and a half gallons of distilled water, and heat to brisk ebullition with stirring. Remove the basin from the fire, allow it to settle during ten minutes, and then very carefully pour off the clear solution from the sediment. Replace the basin with the sediment on the fire, and having added one gallon of distilled water, again heat to boiling, remove from the fire, settle and decant as before. Repeat the boiling and decantion again with half a gallon of distilled water, and then throw away the residue. Stir the mixed solution obtained, and allow it to settle for half an hour. Then return the clear portion to the cleaned iron basin replaced over the fire, and evaporate the whole to about two or three pints, avoiding too much heat toward the close of the evaporation.

Then set it aside over night to cool and crystallize. Put the whole into a funnel, the lower part of which is obstructed by broken glass, and allow the solution to drain off from the crystals. Return this solution to the basin, placed over the fire as at first, and having added to it one pound of the potassa, evaporate the mixture until it begins to froth and thicken; then add to it two pounds of the binoxide of manganese, and repeat the entire process as with the first two pounds; and, finally, proceed in precisely the same manner with the remaining two pounds of the binoxide. (And, should the making be continued farther, the proportion of potassa may be reduced to half a pound for each two pounds of the binoxide.) Displace the mother liquid contained in the accumulated crystals in the funnel, with distilled water, and dissolve the crystals in about six pints of boiling distilled water; allow the solution to settle for half an hour, and then pour the clear portion off for crystallization. After twenty-four hours' standing, drain the crystals in a funnel, wash them with a fluid-ounce of cold distilled water, and dry them on a delf plate at ordinary temperatures, protected from dust and laboratory vapors. Finally, concentrate the mother liquors, and obtain one more crop of crystals, to be treated as the first, and then add the remaining mother liquor to that first separated from the crude crystals, to be reserved with it for the next making, where it may be taken to represent one and a half pounds of potassa. The yield of finished crystals under good management will be 20 to 25 per cent. of the weight of the oxide used, but under ordinary management will not be over 16 to 18 per cent.

The residuary oxide of manganese directed to be thrown away, when assayed by the method of Fresenius and Will, gives about 60 per cent. of the binoxide, and therefore may be reserved for making chlorine, or possibly to be used over again in this process.

Half of the above quantities in a basin half the size indicated, have been repeatedly used over a good gas flame, but the yield is not proportionally as good, while the time and labor is about the same.

In drying the mixture of binoxide and potassa in the first step of the process, if the solution of potassa be not evaporated to

a very small quantity, the addition of the binoxide causes troublesome spitting, and the little drops thrown out are liable to burn the hands and face of the operator, or fly in his eyes. The aspersion with water requires care and skill to get the whole mass quickly moistened with the least possible loss by the explosive flying off of the finer particles. There is always much loss from this cause, and the portion lost is the most soluble and valuable portion of the whole. When finally heated ready for dissolving out the soluble portion, the whole mass weighs within 100 grains of three pounds, whilst the sum of the weights of the binoxide and potassa would give four pounds. This loss is doubtless in great part water from the potassa, but cannot all be accounted for in this way, even when the loss by dust is added. In dissolving out the salt from the insoluble residue, long boiling should be avoided, because any lower oxides of manganese that may have been formed would be oxidized at the expense of the permanganate. The insoluble residue should not be washed farther than is indicated in the process, because the quantity remaining in the residue is insignificant, and does not repay the loss from additional evaporation. The exhausted residue weighs a few grains less than twenty-eight ounces. Then as the two pounds of binoxide contained about 71 per cent., or nearly twenty-three ounces of pure binoxide, the loss of four ounces of this would be a little over one-sixth, or between 16 and 17 per cent., and this quantity would represent about seven ounces of permanganate of potassa, and would indicate about 950 grains as the quantity of potassa really utilized or combined in the process, all the remainder being excess; and, in practice, without such excess, the product is very small. This is a curious and unaccountable feature in the process. The calculated yield of seven ounces of permanganate is, however, never realized, but oftener four or four and a half ounces. What it might be upon a larger scale is as yet undetermined, but the probability is that it would not be better. It would doubtless increase a little by accumulation as the process was continued, since the mother liquor, being continually passed on, would carry a portion of the salt with it. In making the process a continuous one, the proportion of potassa would finally be reduced to about three or four ounces to the two

pounds of the binoxide, thus economizing the expense for material. Then, if the residuary binoxide could be powdered and used over again, the expense would be still farther reduced. The principal items of cost, however, are the skill time and labor.

The evaporation of the clear solution should be conducted with care or by steam heat, particularly toward the close, as too much heat then, appears to decompose a portion of the salt, with the evolution of gas—probably oxygen. If the evaporation be carried beyond the point indicated there is much loss. Whilst, if it stop short of that, an unnecessary proportion of the salt is carried on in the mother liquor to the next portion made. The treatment of the crude crystals and their purification by recrystallization is simple enough and needs no comment. The crystals are usually obtained in fine slender needles, and are purest when small, because then the washing is more effectual in freeing them from potassa. These crystals in drying always undergo a slight amount of decomposition from the organic matter in the atmosphere, and consequently, they always give a slight deposit of hydrated binoxide of manganese upon being dissolved. The amount however is practically insignificant when the salt has been carefully prepared. The presence of caustic potassa and chloride of potassium frequently present, is a much more serious objection to the salt containing them because both are active irritants. The salt should always be well crystallized and dry, and should stand the sulphate of iron test.

How the oxidation is accomplished in the above given process,—or rather whence the oxygen is obtained, the writer cannot tell. At first it was supposed to be by decomposition of the water of aspersion, but afterwards it was thought more probable that it came from the air, and that the agency of the water was merely that its vapor or steam displaced the nitrogen left in the interstices of the powder after the oxygen of the air had been absorbed, and then as this steam was driven off, it gave place to fresh supplies of air for the oxidation. The powder before aspersion is greenish black, and gradually changes with each aspersion to a rich deep chocolate or purplish

brown color, and the same quantity of water moistens it more and more each time it is applied as the solubility increases.

The supposed advantages of this process over those hitherto published are mainly, simplicity and economy of material, apparatus and labor. It entirely dispenses with the use of the most expensive material, namely chlorate of potassa,—avoids the crucible operations and the high heat, which are always difficult and troublesome,—avoids the use of acids, and at the same time greatly economizes the potassa; and, finally, avoids the risk of crystallizable contaminating salts.

Among its prominent disadvantages are its slowness and the smallness of the per diem yield, since one man could probably make but two portions of, say four pounds each, upon one fire in a day, and could scarcely attend well to more than two fires. Another disadvantage will be the difficulty of teaching ordinary assistants to manage the aspersions properly, without special apparatus.

Brooklyn, August 20th, 1864.

REMARKS ON THE PREPARATIONS OF THE U. S. PHARMACOPŒIA, 1860.

By William Procter, Jr.

(*Continued from page* 306.)

In continuing the remarks on the Pharmacopœia, the subject next in order is that of the solid extracts. The changes made in the revision of these formulæ consist in altered names, modified preparations and manipulation, and new preparations. The present number is 32, against 28 in the old edition; of these eight are new preparations, four of the old ones being dismissed.

Extractum Aconiti Alcoholicum.—Extract of Aconite Leaves from the expressed juice has been dismissed, and the formula for the alcoholic extract of the leaves retained in a form modified by the use first of alcohol, and then of diluted alcohol; a pint of the former for each 12 troy-ounces of the leaves; percolating a pint of tincture by adding diluted alcohol, and concentrating this by spontaneous evaporation to a syrupy consistence to be mixed with the product of the evaporation of the liquors obtained by

continuing the percolation with diluted alcohol. The new process limits the temperature to 160° Fahr., which, if literally followed, will sacrifice all the menstruum. In the same manner it is directed to prepare the alcoholic extracts of conium, digitalis, stramonium, helleborus and valerian, the two last from the roots and the former from the leaves.

Since the publication of the Pharmacopœia, the extraordinary rise in the price of alcohol, due to the revenue tax on whisky, renders the literal observance of this formula for these extracts highly expensive, as for each 12 troy-ounces of material 2½ pints, or about one dollar's worth of alcohol, is lost in obtaining about four ounces of extract. It is believed that by careful and slow distillation with a water bath heat the alcohol of the second liquid may be regained, or if a vaccuum evaporator can be used the whole may be separated. This points to the importance of such an apparatus being at command, and it is to be hoped the attention of some pharmaceutical engineer will be directed to getting up an arrangement sufficiently cheap to be within the reach of an apothecary who desires to prepare his own extracts. We presume, with a strongly made gallon still, a common exhausting syringe might reduce the temperature of ebullition sufficiently low to save the alcohol and avoid injury to these preparations, provided the joints could be rendered sufficiently tight in an economical manner.

The alcoholic extracts of belladonna and hyoscyamus are directed to be made from the powdered leaves by means of a menstruum two-thirds alcohol and one-third water, instead of equal parts as before, and the evaporation being limited to a water bath heat admits of distillation to recover the alcohol.

There seems to be no good reason why stramonium leaves should be treated differently from belladonna leaves, being no more susceptible to injury by heat; yet we find the alcoholic extract of stramonium ranged with aconite, digitalis and conium, in relation to the avoidance of temperature.

The inspissated juices of belladonna, conium, hyoscyamus and stramonium are prepared as in the old edition.

Extractum Arnicæ Alcoholicum is a new preparation, solely

intended as a means of making the *Plaster of Arnica.* It is made by distilling the alcohol, by means of a water bath heat, from a tincture of arnica made by percolation with two parts alcohol to one of water. By careful manipulation three-fourths of the alcohol used in this formula may be recovered.

Extractum Cannabis Purificatum.—It is presumable that the commercial extract of Indian Hemp is made by processes variable in their details, as it is found to differ materially at one time and another, both as regards its medicinal activity and the proportion of matter insoluble in alcohol in the extract. Whence comes this brown residue in the commercial extract? We find the best reason for its presence in the manner of making on a large scale. The hemp is put in a still, rectified spirit (alcohol U. S. P.) is poured on, and the heat applied until the drug is well decocted, probably decanting the first hot liquors, adding more spirit, and again decocting. During this process the alcoholic strength of the menstruum is altered by the volatilization of a part of the alcohol, and consequently other matter beside the resin, of an extractive nature, is taken up and remains in the final product on distilling off the alcohol from the tinctures. The only other way to account for its presence is designedly using diluted alcohol at the end of the process with the intention of getting a larger product.

The London process for extract of Indian hemp directs it to be made by macerating powdered Indian hemp in five parts of rectified spirit without heat, pressing and evaporating in a still to the state of an extract. It is very probable that this extract will dissolve without appreciable residue.

The U. S. Pharmacopœia of 1860 directs nearly equal parts of the commercial extract of Indian hemp and alcohol to be rubbed together until they are mixed, six parts more of alcohol added and mixed, and then, after standing 24 hours, filtered, and evaporated at 160° to dryness. When equal parts are rubbed together a thick syrupy solution of the soluble portion of the extract is effected, with which, by continued malaxation, the insoluble portion will form a semifluid mixture, but as soon as the remainder of the alcohol is added the brown extractive, not being

soluble in the alcohol, precipitates, in a consistent state, owing to the abstraction from it of a part of its moisture by the alcohol. After 24 hours maceration the tincture is filtered, the dregs washed with alcohol, and the liquid evaporated. The probability is that nearly all the extract of hemp used in dispensing is the commercial. We have not seen a prescription for the purified extract as yet; hence the inference is that this preparation is mainly intended for the preparation of the tincture. If this be true it were better to have included it in the recipe for the tincture. I am not aware that any experiments have been made to ascertain whether the matter insoluble in alcohol has any activity, but presume that it has not, and to this extent the commercial extract is deficient in power, yet there is great reason to believe that all the merely resinous matter of the commercial extracts is not true *cannabin*, else there could not be so much variation as is found.

Extractum Colocynthidis Alcoholicum.—This formula may be looked upon as preliminary and auxiliary to that for the compound extract in which it was formerly included. The process is entirely practicable, and furnishes a good product where the drug has been selected. Forty-eight troy ounces of crude colocynth, and two gallons of diluted alcohol are required. The alcohol is nearly all recovered, and may be used again. The evaporation is continued to dryness so that the product will powder, in which state it is directed to be kept, and amounts to about one-seventh of the colocynth employed to make it.

Ext. Colocynth. Comp.—This formula has been modified nearly as prepared by Dr. Squibb, (see Amer. Jour. Pharm., vol. v. 97), which composition is based upon an analysis of the ingredients, as to the dry product of each as contained in the dried extract; by then using each ingredient in powder the uniformity of this very important preparation may always be controlled. By substituting resin of scammony for the scammony, a check is given to avoid the adulterated scammony of commerce, and the genuineness of scammony resin may be easily determined by chemical and physical tests.

The satisfaction attending the use of this form of the extract

in dispensing is great, and were it not for its expensiveness it would be generally adopted; but despite the claims of the Pharmacopœia, druggists continue to use the old recipe with adulterated scammony or with a lesser proportion of scammony resin, the presence of which in the extract is the true cause of its high price. It has been suggested to use podophyllum resin in lieu of scammony, but while the recipe remains as it is this is not admissible.

Ext. Dulcamaræ.—This extract is made with diluted alcohol in lieu of water—the alcohol to be recovered by distillation.

Ext. Ignatiæ Alcoholicum is made precisely by the formula for alcoholic extract of nux vomica, which is modified by directing the drug in powder, instead of specifying the manner of getting it in powder.

The extracts of Cinchona, Jalap, and Podophyllum are, except in the language of the recipes, unchanged; and the same may be said of those of Gentian, Butternut and Quassia, except that the evaporation is now partly by ebullition.

Ext. Rhei Alcoholicum is modified, by using, first strong alcohol, and then diluted alcohol, so that by the spontaneous evaporation of the first liquid the odorous volatile part of the root may be more effectually retained in the extract. In the evaporation of the second liquid the temperature is limited to 160° F., but with a water bath heat, slowly conducted, distillation may be used to recover the alcohol without detriment to the product..

Extract. Senegæ Alcoholicum is one of the new preparations, and is a simple extract made by percolation with diluted alcohol, recovering the alcohol by distillation with a water bath heat. This extract affords an elegant means of making the decoction, extemporaneously, in dispensing; using about two drachms of the extract to a pint of hot water.

Ext. Taraxaci is unaltered.

Extract. Valerianæ Alcoholicum.—It has already been stated that this extract is prepared like alcoholic extract of aconite. When the preliminary percolation with strong alcohol is carefully

conducted, the valerian being in fine powder, nearly all of the volatile portion of the root is included in the first liquid, and there is no impropriety in evaporating the second liquid by distillation so as to recover the alcohol; but this cannot be done with the first liquid, which in this case should be concentrated at near the ordinary temperature.

Fluid Extracts.

In no respect is the Pharmacopœia more changed than in this chapter. Formerly five fluid extracts and two oleo-resins, called fluid extracts, were found in it; now twenty-five of these preparations are recognized, and public medical opinion goes much further, calling for a number of them not at present authorized.

Ext. Buchu Fluidum.—In the original formula for this preparation, suggested by the writer, (see *Amer. Jour. Pharm.* vol. xx. page 85), the strength was half a troy-ounce to the fluid-ounce. In the authorized formula it is made ounce to fluid-ounce. The most difficult point in the proper conduction of this process is to get the drug in powder without injury. It should be at least as fine as the Pharmacopœia directs, a 50 mesh seive powder; but there is no objection, rather an advantage, in having it finer, provided the volatile ingredient of the buchu does not suffer loss in getting it so. Very much depends, in the formulæ of which this is a type, upon the slow, regular, and thorough solvent action of the menstruum in obtaining the reserved liquid, in this instance twelve fluid ounces in bulk, as, independent of the isolation of nearly all of the valuable constituents which are thus exempted from subjection to the heat of evaporation, there is less need of pushing the percolation so far by which a less proportion of alcohol will be required—a point of great importance at the present juncture.

Buchu leaves contain much mucilage, which is excluded from this preparation, it not being deemed of any medicinal value, as was supposed in constructing the original recipe.

Ext. Cimicifugæ Fluidum. In this preparation, owing to the large proportion of resinoid matter it contains, the formula requires the use of stronger alcohol to the extent of a fluid ounce

and a half for each troy ounce of the finely powdered cimicifuga, the whole of which is to be obtained as a concentrated tincture by displacement with diluted alcohol. The pint and a half of tincture thus obtained is, by spontaneous evaporation, reduced to twelve fluid ounces and set aside. Two pints more of percolate being obtained with diluted alcohol the liquid is to be reduced to four fluid ounces by evaporation at 150°. Now if the preliminary percolation has been well conducted, no injury will result from regaining the alcohol from the last percolate by distillation, but the first alcohol is necessarily lost, unless a vaccuum apparatus is employed. There is one point in the directions of this formula that needs correction, viz., in the last paragraph at page 163, last sentence; it should read, "Then add *it to* the tincture first obtained, very gradually, so as to avoid precipitation," &c. The italicized words are wanting. The reason is that the last evaporated liquid, being very nearly aqueous, will precipitate the resin from the tincture if the latter is suddenly mixed with it; but when the addition is gradually made in the contrary way this does not occur to much extent.

Ext. Cinchonæ Fluidum.—This is the formula of Alfred B. Taylor, as published, (*Am. Jour. Phar.* vol. xxiii., page 218), except that the quantity of sugar is reduced from 14 to ten troy ounces to the pint of fluid extract. When well made it is an opaque orange red liquid which, on standing, separates into a transparent syrupy superstratum and a sedimentary flocculent deposit, which easily incorporates by agitation and which is valuable, from the presence of cincho-tannates.

Ext. Colchici Radicis Fluidum.

Ext. Colchici Seminis Fluidum.—The proportions and manipulation of these two formulæ are nearly the same as those for buchu, but the menstruum consists of two parts of alcohol to one of water.

Fluid extract of colchicum root tends to deposit a sediment which, however, is of no value, and the sediment is larger in proportion to the weakness of the alcohol. On the other hand, the fluid extract of the seed tends to separate a fixed oil which rises to the top, and which appears to be inert, (see J. M. Maisch in

Am. Jour. Phar. vol. xii. p. 97). When carefully made they are powerful and valuable preparations, but the seed require to be in powder to be entirely exhausted by this formulæ.

Ext. Conii Fluidum.—The object of the acetic acid in this process is to give stability to the preparation, and to prevent the decomposition of the natural salt of conia during the evaporation. It is of the utmost consequence to choose the drug in a well-preserved condition and green color, and to have it in a uniform fine powder, to get nearly all of the virtues in the 12 fluid ounces of received fluid. In this instance it is necessary to lose the alcohol, rather than, by excessive heat, to endanger the preparation, unless the vacuum pan be used.

Ext. Dulcamara fluidum.—In this preparation bitter-sweet in moderately fine powder is exhausted with diluted alcohol, the alcohol regained by distillation, and sugar added for its preservation prior to the final evaporation, which, being concluded, leaves but little if any alcohol present. Some have found this preparation to ferment. I have generally found it to keep well, although on one occasion a disposition to eliminate gas was observed; but the preparation had not medically deteriorated. It will be easy to control this, by reserving two fluid ounces of the first tincture that passes, and after evaporating the fluid extract to fourteen fluid ounces, to add it. This precaution, however, is hardly required.

Extractum Ergotæ fluidum.—This preparation is made from finely powdered ergot, by means of acetic diluted alcohol in manner and proportion used for fluid extract of conium. The use of the acid was proposed by the writer of this notice at a time when propylamin was presumed to be the chief active constituent of the drug. It had long been known that the active matter of ergot was fugitive, and it was practically found, that a solution of ergot could be manipulated with little if any loss of power if kept decidedly acid. The discovery by W. T. Wenzell, (see *Amer. Jour. Pharm.* vol. xii. page 193, 1864,) of the presence of two organic alkaloids easily decomposible in their nature, lends additional reasons why acetic acid is a useful agent in preserving

this important preparation. Fluid extract of ergot should have no odor of propylamin.

Ext. Gentianæ fluidum, is practically a concentrated tincture made by operating with diluted alcohol, reserving the first portion and evaporating the last. The still may be used to recover the alcohol from the last percolate. Fluid extract of gentian is a transparent deep brown, very bitter liquid, possessing the odor of the drug, and is an elegant means of prescribing this tonic in mixtures.

Ext. Hyoscyami fluidum, as originally prepared, was of half the officinal strength. It is now, very properly, of the proportion of minim to grain. The formula is very nearly identical with that for colchicum root, except that the final liquid is directed to be concentrated at a temperature below 150°. When a water-bath heat is used, it is probable that no injury would result from recovering the alcohol by distillation. The best English hyoscyamus, imported in glass, yields with this process a most valuable preparation, more reliable than the extract of commerce, and perhaps less deteriorated than the solid alcoholic extract prepared in the same manner, except further concentrated.

Ext. Ipecacuanhæ Fluidum.—The introduction of this preparation is one of the best innovations of the Pharmacopœia of 1860. The use of acetic acid as a means of securing the alkaloid in a soluble condition has been objected to by some as altering the previous character of the syrup; but the small quantity of acid used, and the small dose of the extract, is sufficient to render this reason invalid. By employing the finely dusted powder of commerce, the quantity of alcohol necessary to exhaust the root is very small when the process is carefully conducted. The separation of the matter insoluble in water that is taken up by alcohol and called resinous matter in the Pharmacopœia, has been objected to as injuring the emetic value of the preparation; but we believe this opinion to be erroneous, especially in view of the precaution of using acetic acid to secure the soluble condition of the emetia. To get a fluid extract that will mix, without separation of any flocculi, with

simple syrup, requires careful attention to the conditions of the recipe as regards the separation of all the alcohol.

Ext. Lupulinæ Fluidum. In making this preparation, the granular character of the powder renders it too porous for slow percolation, and it is requisite to close the neck of the percolater by means of a cork until the percolate drops but slowly. In this way nearly the whole of the oleo-resin may be secured in the first liquid. When operating on a large scale a portion at least of the alcohol may be recovered from the second liquid. When carefully made from good material this fluid extract is well marked in its character, being strongly odorous of the lupulin, and fully represents it.

Extract. Pruni Virginianæ. This preparation has been already so fully remarked on in this Journal (vol. iv. pp. 22 and 106, and more recently in Proc. Amer. Pharm. Assoc., 1863, page 243), that it is unnecessary to dwell upon it. The chief points of attention are to secure genuine wild cherry bark, in fine powder; to percolate slowly; to free the preparation from alcohol *before* adding the almond emulsion, and to give the latter time to do its work. In making a quantity of this extract I have always preferred to use a muslin filter in a large glass funnel, and as the strong liquid ceases to be visible above, to add water so as to chase out the absorbed portion. If well made, this preparation, mixed with water without precipitation in all proportions, has a strong, hydrocyanic bitter taste.

Extractum Rhei Fluidum.—This formula needs to be modified. The fault is, the presence of so much alcohol as to cause the crystallization, and precipitation in granular form, of a large portion of the sugar. In the formula, as originally suggested by the writer, this fluid extract was not subject to this fault, but was considered too thick in consistence. To avoid this difficulty he suggested (Proc. Amer. Pharm. Assoc. 1859, p. 274), to employ alcohol instead of diluted alcohol, so as to avoid much of the gummy matter, and reduce its specific gravity, reserving the first liquid for spontaneous evaporation until free from alcohol. It was no doubt the intention of the re-

visors of the Pharmacopœia to accomplish this end, but unfortunately the effect of the presence of alcohol was not sufficiently considered in its relation to the solubility of sugar, which, though retained in solution for awhile, is gradually precipitated. Prof. Graham has suggested the use of a menstruum consisting of two parts of alcohol to one of water with aromatics in substance, thus operating on all and evaporating to one-fourth of the bulk of the tincture collected, and adding sugar in the proportion of six ounces to the pint of fluid extract. The probable remedy is either to evaporate the first solution farther to rid it as far as possible from alcohol, to add the sugar in the form of a hot syrup made with the evaporated second liquid of the recipe so as to make a pint; or, if the alcohol is left in the preparation then to use less sugar and more liquid. The writer has suggested the former plan in his paper on Fluid Extracts, (Proceedings Amer. Pharm. Assoc., 1863, p. 239).

The reader will also observe the absence of the aromatics of Pharm. 1850. This, by unmasking the natural odor of the drug, renders it easier to judge the preparation, affords a means of making the simple syrup, and, when needed, the aromatics can be added.

Extract. Sarsaparillæ Fluidum is a new preparation, a simple fluid extract, offering the physician a means of associating this drug in mixtures or syrups in any proportion he pleases. The sarsaparilla should be as fine as a fifty mesh sieve will make it. In this condition it becomes somewhat glutinous on adding the diluted alcohol, but the lumps formed should be rubbed between the hands until a uniformly damp powder is obtained; by then packing this moderately in the percolator a dense solution passes as the diluted alcohol traverses the powder, and the drug is exhausted with less diluted alcohol than the formula indicates. The same remarks apply to the preparation of the sarsaparilla in the compound fluid extract, which, unless the other ingredients are all equally well ground, should be moistened separately; but when all are in powder, as directed, there is an advantage in mixing the dry powders intimately before moistening, which in great measure prevents the sarsaparilla

from getting into lumps. The writer has often spent several hours in properly moistening a mass of ingredients for twenty-five pints of this extract, and has been agreeably surprised at the small amount of menstruum which would exhaust them when properly prepared for percolation.

Extractum Sennæ Fluidum.—In comparing this recipe with that of 1850 the reader is at once struck with the absence of aromatics from the new fluid extract. The manipulation also is quite different. By reserving the first pint of percolate and evaporating it spontaneously to half a pint, much of the activity of the senna is removed and kept from the injurious action of heat in evaporating. The second liquid is directed to be mixed with the sugar and evaporated to half a pint on a water bath. By using a water bath still the alcohol may be recovered. The reasons for omitting the aromatics are: 1st. That physicians may suit themselves as to what aromatics they wish. 2d. That the odor of the senna will afford an index of the good quality of the preparation. 3d. That the fluid extract may be used in making mixtures of senna where the aromatics would be unnecessary.

Ext. Serpentariæ Fluidum. This fluid extract was introduced by Mr. Taylor, (see this Journal, vol. xxv., p. 206). The officinal process is like that for fluid extract of gentian.

Extractum Spigeliæ Fluidum. This is made by the formula for fluid extract of senna, and it is chiefly employed to make the compound fluid extract of spigelia and senna. The simple fluid extract of spigelia affords the physician an admirable means of prescribing this excellent vermifuge in mixtures, but its high price has at present thrown it greatly out of use.

Ext. Taraxaci Fluidum is made by a formula published in the Proceedings of the Association for 1859, by the writer of this, and is a concentrated tincture, containing but 25 per cent. of alcohol. It is a good preparation.

Ext. Uvæ Ursi Fluidum contains both alcohol and sugar as preservative agents, and is made by reserving a portion of the first tincture, evaporating the rest with the addition of sugar and mixing them.

Ext. Veratri Viridis Fluid. is made by extracting sixteen ounces of the finely powdered root with strong alcohol, reserving half a pint and evaporating the remainder to the same bulk and mixing them. It is an efficient preparation, twice the strength of Norwood's tincture, when made from well-selected hellebore.

Ext. Zingiberis Fluidum is made by a formula similar to that for fluid extract of valerian and of the same strength.

The consumption of alcohol in making fluid extracts, viewed in connection with the present high price of that article is a subject demanding the most serious consideration of manufacturers, druggists and apothecaries. The question has been raised whether it is good policy in the government to tax this agent of production so heavily; whether it does not decrease the consumption and consequently the manufacture of many preparations, and thus injure the revenue to an extent that will more than counterbalance that arising from the tax. This remark of course applies only to alcohol used in chemical and pharmaceutical manufacturing and the arts. But this is not the proper time for this discussion; a more important one is that of economizing the use of alcohol in manufacturing pharmacy. To make a gallon of a tincture of gentian it is clear enough that four pints of alcohol, besides that portion retained in the ingredients, must be consumed. But to make a gallon of fluid extract of gentian 12 pints of alcohol are required, and yet but about three pints are retained in the preparation, all the rest being either lost by evaporation or, if saved, regained as far as possible by distillation, but always with a considerable loss. A part of the alcohol consumed is that retained in the ingredients, for in order to obtain the prescribed quantity of tincture the addition of the menstruum must go on until it all passes. This applies equally to ordinary tinctures and to fluid extracts and many syrups. Dr. Edward R. Squibb, of Brooklyn, has suggested the idea whether it will not be more economical on the one hand and produce more efficient preparations on the other, in making fluid extracts, to stop the percolation when twelve fluid-ounces of percolate has passed from 16 troy

ounces of the substance treated, and consider that as the finished preparation? He assumes the position that this quantity, if the percolation is conducted right, will on the average contain at least three-fourths of the virtues of the substance treated, and the great loss in alcohol occasioned by pushing the percolation to get the last fourth, as well as the injury to the drug by the heat of evaporation, will more than counterbalance the loss of what extractive matter remains in the percolator.

To establish the truth of this assumption would require a series of analyses, as well as a corresponding series of therapeutical experiments, and whilst admitting the great probability that the results in the main would be satisfactory if conducted by a careful manipulator, they could hardly be depended upon in general hands. The strongest reasons in its favor are the entire absence of heat in preparation, and the simplicity of the process; being in fact only the first steps of the process for a common tincture. If there were any checks known by which the uniformity of the results could be insured, the idea of Dr. Squibb might be adopted, but until then it is doubtful whether the average results would equal those now attained by the old recipes.

ON THE PREPARATION OF FANCY LEATHERS,—KID, CHAMOIS, &c.

By F. Crace Calvert F. R. S.

Extracted from the 3d Cantor Lecture.

Fancy Leathers.—Allow me now to give you a slight insight into the methods of preparing various fancy leathers, such as Morocco, Russia enamelled, tawed, or kid leather, used for soldiers' belts, gloves, &c, and lastly all leathers used for wash-leather, gloves, &c. Until the middle of the eighteenth century Morocco leather was wholly imported from that country, for it was in 1735 that the first Morocco works were established in Paris, and similar manufactories were soon set up in various parts of the Continent and in this country. The process by which Morocco leather is prepared is as follows:—The goat

and sheep skins, which are especially used for this branch of manufacture, are softened, fleshed, unhaired, and raised or swelled by methods similar to those already described, but one essential element of success in this kind of leather lies in the perfect removal of all lime from the skins, which is effected by plunging the well-washed skins in a bath of bran or rye flour, which has been allowed to enter into a state of fermentation. The result is, that the lactic and acetic acids generated by fermentation of the amylaceous substances combine with the lime and remove it from the skins. The other essential point is the mode of tanning the skins. Each skin is sewn so as to form a bag, and filled through a small opening, with a strong decoction of sumac, and after the aperture has been closed the skins are thrown into a large vat containing also a decoction of the same material. After several hours they are taken out, emptied, and the operation is repeated. To render these skins ready for commerce it is necessary to wash, clean, and dye them. The latter operation was formerly tedious, and required great skill, but since the introduction of tar colours, the affinity of which for animal matters is so great, it has become comparatively easy. The skins, after they are dyed, are oiled, slightly curried, and the peculiar grain, characteristic of Morocco leather, is imparted to it by means of grooved balls of rollers. There are two inferior kinds of Morocco leather manufactured, viz., those called *roan*, prepared in a similar way to Morocco, but not grained, and *skivers*, also prepared in the same manner, but from split sheep skins. I owe to the kindness of Mr. Warren De la Rue the beautiful specimens of leather before me, which will enable you to appreciate the various qualities of these interesting productions.

Russia Leather.—The great esteem in which this leather is held is owing to its extreme softness and strength, its impermeability, and resistance to mildew, which latter property is imparted to it by the use of a peculiar oil in its currying, that is birch-tree oil, the odour of which is well-known as a distinguishing feature of Russia leather. As to its preparation, I will merely state that it is very similar to that of Morocco, with these differences, that hot solutions of willow bark are used instead of sumac; that it is generally dyed with sandal wood and

a decoction of alum; and, lastly, as already stated, the birch-tree oil is used in currying it.

Enamel Leather.—This class of leather is usually prepared with calf and sheep skins tanned in the ordinary manner. They are dyed black by rubbing them over with a decoction of log-wood, and then iron liquor or acetate of iron. The leather is softened with a little oil, and is ready to receive a varnish, which is applied by means of a brush, and composed of bitumen of Judea, copal varnish, oil varnish, turpentine, and boiled oil.

Tawed or Kid Leathers.—The manufacture of this class of leathers differs entirely from those already described, as their preservative qualities are imparted by quite different substances from those used with other leathers, the preservative action of the tannin being substituted by that of a mixture of alum and common salt. Let us examine together a few points connected with the production of this class of leather. One of the most interesting characteristics is the method of unhairing sheep, lamb, and kid skins, after they have been well washed and fleshed on the beam. The old process of unhairing by smearing on the fleshy side with a milk of lime, was improved by mixing with the lime a certain amount of orpiment, or sulphuret of arsenic, but Mr. Robert Warrington having ascertained that the rapid removal of hair in this case was not due to the arsenic, but to the formation of sulphuret of calcium, proposed, with great foresight, the following mixture as a substitute for the dangerous and poisonous substance called orpiment—viz., three parts of polysulphuret of sodium, ten parts of slacked lime, and ten parts of starch. The polysulphuret of sodium may be advantageously replaced by the polysulphuret of calcium. The skins, unhaired by any of these processes, are now ready to be placed in a bran or rye bath, as with Morocco leather, or in a weak solution of vitriol, to remove, as already stated, the lime. After the lime has been thoroughly removed from the skins, they are dipped in what is called the white bath, which is composed, for 100 skins, of 13 to 20 lbs. of alum, and 4 to 5 lbs. of chloride of sodium or common salt, and the skins are either worked slowly in this bath or introduced into a revolving cylinder to facilitate the penetration of the preservative

agent, which, according to Berzelius, is chloride of aluminium resulting from the action of the chloride of sodium on the alum. When the manufacturer judges that the skins have been sufficiently impregnated with the above mixture, he introduces them into a bath composed of alum and salt in the same proportions, but to which is added 20 lbs. of rye flour and 50 eggs for 100 skins. After remaining a few hours they are removed, and allowed to dry for about fifteen days, and are then softened by working them with a peculiar iron tool, and the white surface which characterises that class of leather is communicated to them by stretching them on a frame and rubbing them with pumice-stone. A large quantity of tawed leathers are also preserved retaining their hair, which is done by simply suppressing the unhairing and rubbing processes.

Chamois, Wash, or Oiled Leather.—This class of leathers are named from the fact that formerly they were exclusively produced from the skin of the chamois, but at the present day sheep, calf, and deer skins, and even split thin hides, are manufactured into this kind of leather. I should also state that the employment of this kind of leather has greatly decreased of late years, owing to the general substitution of woolen fabrics in articles of clothing. You will see by the following description that the preparation of this class of leather differs entirely from those previously detailed; the conversion of skins into leather, or from a substance subject to putrefaction to one free from that liability, being no longer effected by tannin, as in the case of hides, and Morocco and Russia leathers, or by the use of mineral salts, as in the case of tawed leathers, but by that of fatty matters, especially animal oils, such as sperm. The skins are prepared in the same manner as for tawed leathers, and then submitted to what is called the prizing operation, which consists in rubbing the hair side of the skin with pumice stone and a blunt tool or knife, until the whole of the rough appearance is removed, and the skin has acquired a uniform thickness. They are then worked on the peg until the great excess of moisture has been wrung out, and plunged into the trough of a fulling mill, to the action of the wooden hammers of which they are subjected until nearly dry. They are then placed on a table and oiled, and several of them, after being rolled together, are replaced in the trough of the fulling

mill. When the oil has been thus worked into the substance of the skins, they are removed, exposed to the atmosphere, again oiled, and once more subjected to the fulling mill; after which they are placed in a moderately heated room for a day or two, the object of which is twofold, viz., to facilitate the evaporation of the water and the penetration of the oil, and to create a slight fermentation, by which the composition of certain of the organic substances have undergone such modification as to enable them to combine in a permanent manner with the fatty matters. These processes are repeated until the manufacturer deems the leather sufficiently prepared to be fit to undergo the following operations, viz., to be immersed for several hours in a caustic lye bath, to remove the excess of oily matter, washed, and pegged. It is only necessary to stretch the leather on a table, then on a horse, and lastly between rollers, after which it is ready for the market. The ordinary buff colour of these leathers is communicated by dipping them, previously to the finishing processes, into a weak solution of sumac. Before speaking of the further processes necessary to fit these leathers for the glove manufacturer, allow me to have the pleasure of describing that of Mr. C. A. Preller, whose mode of preparing leather is very interesting, owing to the rapidity with which he converts hides into leather, and also to the remarkable toughness which his leather possesses. To attain these desirable ends Mr. Preller proceeds as follows:—The hides are washed, slightly limed, unhaired, fleshed, and partially dried; they are then smeared with a mixture made of fatty matters and rye flour, which having been prepared a few days previously has entered into fermentation, and which has so modified the fatty matters as to render them more susceptible of immediate absorption by the hide. I think that this feature of Mr. Preller's plan deserves the serious notice of all engaged in the manufacture of oiled leathers, as it appears to prove that fatty acids (or modified fatty matters) are better suited for combination with skins than neutral fats. The hides, with additional fatty matters, are then introduced into the large American drums, previously noticed in speaking of currying, and after four days they are removed, washed in an alkaline fluid, worked with a pummel and slicker, and after being dried they are ready for market.

Gloves.—The manufacture of this article is now a most im-

portant branch of trade, and is the means of giving employment to large numbers of people in several towns in this country as well as on the Continent. To render the above-mentioned oiled leather sufficiently soft and pliable for gloves it is necessary to submit it to the following further operations:—The Chamois, kid, or other skins are rubbed over with a solution composed of 1 lb. of soap dissolved in half a gallon of water, to which is added 1½ lb. of rapeseed oil and twenty yolks of eggs, or, what has recently been found to answer better than eggs, a quantity of the brains of animals reduced to pulp. The use of the two latter substances is extremely interesting in a scientific point of view, for they both contain a peculiar nitrogenated matter called vitalline, and special fatty matters called oleophosphoric and phosphoglyceric acids, which doubtless, by their peculiar composition, communicate to the skins those properties which characterise this class of leather. The skins are then washed and dyed in various colors, after which they are softened, and rubbed with an instrument adapted to slightly raise the surface, and give it that well-known velvetty appearance belonging to glove skins. I shall not take up your time by entering into the details of dyeing these leathers, but describe the following process for bleaching them:—

Bleaching of Skins.—The only process known until recently for imperfectly bleaching chamois and glove skins was that of submitting them to the influence of the fumes of sulphur in combustion or sulphurous acid, but latterly two modes of attaining that object have been proposed. The first consists in dipping skins for two days in a weak solution of neutral hypochlorite of soda, washing, drying, and rubbing them with soap and oil. The second mode is to dip glove skins into a solution of permanganate of potash, when they soon assume a brownish colour, due to the liberation of the oxygen of the permanganate of potash, and the fixation of the hydrate of sesquioxide of manganese by the skin. The skins so acted on are washed and then dipped in a solution of sulphurous acid, which becomes converted into sulphuric acid by the action of the oxygen of the sesquioxide of manganese, and the protoxide thus produced unites with the sulphuric acid, which is soluble in water. The skins thus bleached when dressed are ready for market.

Gilding of Leather.—The usual mode of ornamenting leather with gold is to apply, in such parts as are desired, a thick solution of albumen, covering those parts with gold leaf, and applying a hot iron, when the albumen is coagulated and fixes the gold. This plan is objectionable when the goods are intended for shipment, and the following method, lately proposed, is far preferable:—On the parts required to be gilt, a mixture, composed of five parts of copal and one of mastic, are spread; a gentle heat is applied, and when the resins are melted the gold leaf is spread upon them.—*Lond. Chem. News, July* 23, 1864.

THE PRODUCTION OF SULPHUR IN ITALY.

By M. P. Bianchi.

The sulphur at present produced in Italy amounts to no less than 300,000 tons a year, the value of which in the rough state is 30,000,000 francs. This yield, which has increased tenfold since 1830, is furnished in great part by Sicily. The quantity produced in Romagna, formerly but small, has since increased to 8000 tons per annum.

During the last ten years great improvements have been introduced in the method of extracting sulphur from its calcareous gangue. It is always obtained by liquefaction by burning a portion of the ore; but this operation formerly performed in small, open, cylindrical furnaces (*calcarelle*) is now effected by simply heaping the stones and covering them with earth as in charcoal burning. These heaps, called *calcaroni*, are of considerable size, often four hundred times larger than the old furnaces. This new mode of operating has the advantage of diminishing the losses occasioned by the production of sulphurous acid, so that the yield of sulphur is increased by one-fifth; besides sulphur can be burnt in this way near houses and gardens, which with the old method was out of the question. Formerly it was burnt only at certain periods of the year, now it can be burnt at any time, so that it is no longer necessary to accumulate large quantities of ore. Finally, the operation, which used to be very frequently fatal to the workmen, is now almost harmless.

Sulphur of Romagna and the Marshes—At Bologna there is a society called "Société des Mines de Soufre des Romagnes,"

which possesses eight mines, five in the province of Forli (Romagna) called Firmignano, Luzzena, Fosco, Busca, and Montemamro. The other three, forming part of the province of Urbino and Pesaro, are those of Perticara, Marazzana, and Montecchio.

Most of the sulphur from these workings is refined at Rimini, whence it is carried to the places where it is most in demand, such as Venice, Trieste, Ancona, Lombardy, Tuscany, &c.

This refined sulphur is chiefly used for making sulphuric acid, and lately for the treatment of the vine. Its price, which varies considerably, is, in cakes, from 213 fr. 10 c. per English ton of 1·015 kilogrammes, and in sticks from 254 fr. 35 c., put on board vessels in the ports of Rimini and Cesenatico, and delivered at the stations of Rimini and Cesana.

Sulphur from the Neapolitan Provinces.—Sulphur is found here in several places, but in small quantities. It is thus found in the volcanic region of Solfatares, where it exists mixed with clay and other matters, from which it is separated by sublimation, but the yield is insignificant. Small deposits of it are found scattered in the district of Majella, one of which is worked at Santa-Liberata. It has recently been announced that there has been discovered at Civita-Nova a bearing of calcaire impregnated with sulphur, but nothing has been said as to its richness and extent. No more is known of another bearing at Santa-Regina, two miles east of Ariano.

Sulphur of Sicily.—Sulphur exists here in a gypseous bed, layers of which extend over a small portion of the island, from Mount Etna to near Trapani. This formation belongs to a geological epoch which has not yet been positively determined. Here, as in Romagna, it contains, besides gypsum, calcaires and clays, more or less marl. In the first case, the sulphur exists in a state of mixture, sometimes uniformly, sometimes irregularly, sometimes in small parallel veins, and more rarely in the form of crystals; in the latter case it is not unusual to find it associated with *cælestine*, or sulphate of strontium. In clay, on the contrary, it is found in globular masses, which is also the case in similar bearings in Continental Italy.

There are about fifty mines in Sicily, employing 20,000 workmen. The most productive mines are in the provinces of Caltanisetta and Girgenti; ranging next in importance are

those of the provinces of Catana, Palermo, and Trapani. The sulphur is extracted in the manner above described by means of *calcaroni*; the loss during the operation amounts to one-third of the ore. Most of the sulphur is exported in the crude state, but little being refined in the island. In this state it is divided into three qualities, the second and third being subdivided into three other qualities. The yield in 1861 was estimated at about 250,000 tons of commercial sulphur, of which about half was produced by the province of Caltanisetta, a third by Girgenti, 25,000 by Catana, and 20,000 by Palermo; the quantity produced by the province of Trapani is very inconsiderable. Most of the sulphur is exported to France and England.

The price of this product has risen during the last few years; in 1860 it sold in the crude state for from 15 to 20 frs. the ton.—*Lond. Chem. News*, from *Moniteur Scientifique*, v. 799. 63.

THE APPLICATION OF DIALYSIS TO THE INVESTIGATION OF ALKALOIDS, NEW PROPERTY OF DIGITALINE.

By M. L. Grandeau.

Graham's admirable researches on molecular diffusion have given to chemical analysis valuable processes for the separation of certain bodies. Toxicology and physiological chemistry especially will profit largely from methods of dialysis.

For some months I have followed up these researches in the medical laboratory of the College of France, and beg permission to submit to the Academy my preliminary results.

Graham has shown that, by the aid of dialysis, very minute quantities of certain poisons, mixed with various organic matters, may be detected, especially arsenious acid and strychnine; and I have myself already experimented on morphine, brucine, and digitaline.

1. *Dialysis of Digitaline.*—Place in the dialyser 100 cubic centimetres of distilled water holding in solution 0 gr. 01 of pure digitaline. Suspend the dialysis after twenty-four hours; carefully evaporate to dryness the liquid contained in the outer vase in a weighed platinum capsule. It will leave a residue weighing exactly 0 gr. 01, with a bitter taste, and presenting the characteristics of digitaline, of which more further on.

Evaporate to dryness in a weighed platinum vessel the liquid

remaining in the dialyser; it volatilizes, leaving no residue, all the digitaline having passed into the dialysed liquid.

2. *Dialysis of Urine, containing 1 gr. 01 of Digitaline.*—Into 45 cubic centimetres of fresh normal urine pour 2 cubic centimetres of a solution containing 0 gr. 50 of digitaline to 100 centimetres cube of water; after eighteen hours suspend the dialysis and evaporate to dryness the liquid in the outer vessel (about 300 cubic centimetres). Extract the almost colorless residue by alcohol; and the alcoholic solution, evaporated to dryness, shows all the characteristics of digitaline with as much clearness as the residue of 2 cubic centimetres of the normal solution of digitaline. Evaporate separately the contents of the dialyser, and the residue will be brown; then extract by alcohol of 95°, and the greenish solution thus obtained will give all the reactions indicating the presence of traces of digitaline. The dialysis then was not complete.

3. *Dialysis of Morphine, Brucine and Digitaline mixed with Animal matters.*—Take the stomach and intestines of a dog (some hours after death), macerate them in water at 25° or 30° for about two hours; filter the yellowish, strongly-smelling liquid through canvas. Divide it into four parts, each of 250 cubic centimetres; to the first add 0 gr. 01 of digitaline; to the second, 0 gr. 02 brucine; to the third, 0 gr. 02 of hydrochlorate of morphine; leave the fourth intact; dialyse these four liquids separately. After twenty-four hours carefully evaporate the liquids contained in the outer vessels; recover each of the residues by alcohol, to separate the mineral salts (salts of soda, lime, &c.) which have been dialysed. The ordinary reagents of brucine (nitric acid) and of morphine (nitric acid, perchloride of iron) clearly show the presence of these alkaloids in the residues of the alcoholic liquids. Digitaline is found equally in the water of the first vessel. Divide the residue of the evaporation of that portion of the liquid to which no vegetable alkali was added into several parts, and test it with the reagents used to discover brucine, morphine, and digitaline. This experiment is merely intended to show that the animal matters, to which the poisonous substances are added, do not by themselves, give reagents, colorations which might lead to error. The result of this test leaves no doubt as to the value of dialysis applied to researches of this kind.

In the course of this preliminary study I endeavored to find some reaction as much as possible characteristic of digitaline. Hitherto we know no reaction for distinguishing digitaline from other vegetable poisons, except the green color obtained by dissolving this substance in concentrated hydrochloric acid. This reaction, as has been observed, cannot be taken as an unfailing indication of the presence of digitaline, for the same color is produced by several other organic matters. The successive action of sulphuric acid and bromine vapors have hitherto seemed to characterize even very small quantities of digitaline. Pure digitaline takes a sienna-brown color on contact with concentrated acid, turning after a time to vinous red, and on the addition of water immediately becoming dirty green. When, instead of operating on, for instance, 1 centigramme of solid digitaline which has not yet been in contact with any liquid, we submit to the action of sulphuric acid the residue of the evaporation of several drops of a diluted solution of digitaline, the color, instead of brown, is lighter or darker reddish-brown, according to the quantity of material employed. With very small quantities of digitaline (0 gr. 0005, for instance), the color is rose, like the flower of the digitalis. On exposing digitaline, moistened with sulphuric acid, to bromine vapors, the mixture instantly becomes violet, and the shade varies from heartsease violet to mauve, according as there is present more or less digitaline. The coloration shown by sulphuric acid, and modified by bromine vapors, is most distinct with the residue of the evaporation of 1 centimetre cube of water containing 0 gr. 005 of digitaline; it is also very clear with 0 gr. 0005 of this poisonous substance. It is observable with even the very faintest traces of digitaline. None of the following substances, which I have submitted to the same reaction, has evidenced this property:—Morphine, narcotine, codeine, narceine, strychnine, brucine, atropine, solanine, salicine, santonine, veratine, phlorhidzine, diturine, amygdaline, asparagine, cantharidine, cafeine.

Dialysis—and in this consists its greatest value—allows the separation of the vegetable poisons from the animal substances with which they are mixed, in a state sufficiently pure to enable us to identify them by their principal characteristics.—*Chem. News*, from *Comptes Rendus*, lviii, 1048.

GLEANINGS FROM THE FRENCH JOURNALS.

By the Editor.

On the Extraction of Cantharidin and on the Assay of Cantharides. By M. Monteeux.—Having observed that cantharidin is insoluble in sulphuret of carbon it occurred to me that this property might be employed in isolating the active principle of cantharides.

If cantharides are treated by chloroform, as has been indicated by Mr. William Procter, and the solution is evaporated, the cantharidin is obtained in the form of crystals disseminated in solid fat and green oil.

By now employing the sulphuret of carbon, this vehicle dissolves the fatty bodies and leaves the cantharidin nearly pure, which it is easy to collect on a filter and wash and weigh.

The study that I have made of these facts lead me to found on them a process for assaying cantharidin in cantharides. Here is the *modus faciendi* I offer:—

Introduce into the adapter of Payen's apparatus, for extraction by vapor, (a vapor percolater,) a wad of cotton, and on this a layer of fine washed sand, 10 to 15 millimetres.

The cantharides to be examined, being reduced to fine powder, 40 grammes (617 grains) are taken and placed on the layer of sand, when it is settled by jarring the beak of the adapter on the table; over the cantharides is put a thin layer of cotton, and above this a circle of filtering paper.

The adapter is then inserted in a flask containing three or four cubic centimeters of ether, which flask is connected by a lateral tube with another flask surmounting the adapter. The apparatus is then heated in a water bath, and when the vapor arrives in the upper flask about 60 cubic centimetres of concentrated ether are poured in the adapter and a safety tube adapted.

The distillation is continued until the liquor passes colorless (about three hours are required), when the apparatus is removed from the water bath; the upper flask removed, ten cubic centimetres of ether added, and on this disappearing below the paper, water is poured on to displace the ether. The ether is distilled off and the residue, after the total disappearance of the ether, is treated with 50 to 60 cubic centimetres of sulphuret

of carbon and the whole thrown upon a double paper filter and well washed with sulphuret of carbon by means of a pipette.

The filters are then dried and weighed, the difference in weight between the empty filter and that containing the cantharidin gives the weight of that principle contained in 40 grammes of the cantharides treated.

By this method, in several assays, the product has ranged between 18 and 22 centigrammes per 40 grammes, an average of 20 centigrammes in 4000 centigrammes.* This process can easily be applied to the preparation of cantharidin for commerce.—*Jour. de Pharmacie*, Juillet, 1864.

On the alkaloid of Croton tiglium. By M. TUSIN.—The author believes he has recognized the presence of an alkaloid in the seeds of Croton tiglium like cascarillin, and which crystallizes like it, but which differs, nevertheless, by its relations with sulphuric and nitric acids. The author does not speak of its composition.

The process for its extraction is the same as that which has been employed by the author in preparing *ricinin*, [see page 423 of this volume] viz: The croton seeds are bruised, exhausted with water and the infusion evaporated. The product is exhausted by boiling alcohol; the alcoholic liquor is allowed to stand until a resinoid matter is deposited, and then evaporated partially, when on standing the *crotonin* is deposited in crystals. The paper does not say whether this principle is identical with ricinin or not—*Zeitschr. fur Chem. und Pharm. and Jour. de Pharm.*, July, 1864.

On a new falsification of Saffron. By M. GUIBOURT.—M. Vesque, Pharmacien of Lizieux, has received recently from a house in Paris, under the name of "*Safran du Gatinais*," 250 grammes of a saffron of inferior quality, containing about thirty per cent. of a material judged to be the stamens. Professor Decaisne, who has examined this substance, has recognized in the length of the filaments, the cylindrical form of the anthers and the large size of the pollen grains, that these stamens are those of a *Crocus*. But they are not the stamens of the mother

*This is more than was found by Warner, who obtained 2·03 parts from 500 or 0·4 from 100, whilst the above is 0·5 per cent.

plant, which have been inadvertently collected with the stigmata, the color of which is yellow and easily distinguishable. They are evidently collected intentionally, dyed artificially and twisted so as to deceive the eye, and in quantity equal to nearly a half of the article. The adulteration is recognized by throwing a certain quantity in a glass of water. The stamens are instantly decolorized and float, whilst the true stigmata fall to the bottom of the water. On comparison with the figures of Hayne, these stamens belong to the Crocus vernus, by the cylindrical form of their anthers, rounded at the summit whilst the anthers of Crocus sativus are terminated like an arrow. Finally, this saffron contains also little marigold petals, colored red like the stamens; these sink in water with the stigmas of the saffron and are recognized by their base, their longitudinal nervures and three pointed terminations. I do not know what opinion to give of a merchant who thus falsifies saffron; the man who takes your purse from your pocket is not more culpable.—*Jour. de Pharm.*, Juin, 1864.

On the Double Carbonate of Potassa and Soda. By M. FEHLING.—This double salt presents itself in rhomboidal efflorescent prisms. It was formed accidentally in making yellow cyanide of potassium, and on another occasion during the preparation of saltpetre from nitrate of soda and potash of commerce. Its formula is $NaO, CO_2 + KO, CO_2 + 12\,HO$. It is very soluble in water and does not reassume its crystalline form on evaporation. It melts in its water of crystallization, which it loses nearly entirely at 212° F. Dried, it is not hygrometric except in very moist air.—*Jour. de Pharm. from Annal. der Chem.*

On a means of detecting Nitro-benzole in Oil of Bitter Almonds. By M. DRAGENDORFF.—This test consists in acting on the adulterated oil with sodium in the presence of alcohol. This metal, in contact with pure oil of bitter almonds, disengages gas, which is augmented by the addition of alcohol, and white flocks, are formed. Nitro-benzole under the same circumstances with alcohol becomes deep brown or black and viscid.

In testing the adulterated oil, take ten or fifteen drops of it, add four or five drops of alcohol, and a fragment of sodium; a

brown deposit, approaching black, in proportion as the nitro-benzole is in excess occurs. This reaction is instantaneous and when the oil contains from 30 to 50 per cent. of nitro-benzole one minute is sufficient to obtain a thick brown liquid.—*Jour. de Pharm.*

GLEANINGS FROM THE GERMAN JOURNALS.

Detection of minute quantities of Mercury.—F. C. Schneider, in an essay "On the chemical and electrolytic behaviour of mercury," states, that the slightest traces of this metal in solution, may be recognised by immersing in the liquid to be examined, the poles of a galvanic battery, both of which should be of gold. Upon the surface of the negative pole, a coating of gold amalgam is thus deposited, which is then to be removed to a test tube. This tube, after being hermetrically sealed, is strongly heated, whereupon the mercury is sublimed, and collects in the further end of the tube. The addition of a *crumb* of iodine and gentle heat, is sufficient to produce the easily recognized red iodide of mercury.—*N. Jahrb. Ph.* xx. 309.

Cotton Seed Oil.—Lipowitz states, that the deep brown commercial oil parts with its coloring matter readily by treatment with alkaline solution, yielding from 80 to 85 per cent. of a clear yellow oil, which is almost entirely without smell, and resembles in taste the finest salad and poppy-seed oils. It solidifies at from 8° to 0° C. The crude oil, which may be ranked among the drying oils, has a sp. gr. of ·928 at 15° C. the purified oil of ·9206. The fatty portion of the crude oil amounting to 15 or 20 per cent., which is readily saponified by alkalies, may be obtained by the action of acids upon the soap in the form of a brownish or greenish buttery-like mass, which is well adapted for a wagon or machine grease, since it remains fluid a long time in a warm place, and does not resinify. It may also be used for the preparation of an odorless potash or soda soap.—*N. Jahrb. Ph.* xx. 330.

Indestructible Writing.—Lucas proposes for this purpose, an ink composed of 20 grains of sugar dissolved in 30 grains of

water, to which is added a few drops of concentrated sulphuric acid. Upon heating this mixture the sugar becomes carbonized, and when applied to the paper leaves a coating of carbon which cannot be washed off. This stain is rendered more permanent by the decomposing action of the acid itself upon the paper, and thus made, it resists the action of chemical agents. The paper should, after drying, be passed through a weak alkaline solution to remove excess of acid.—*Breslauer Gewerbebl. N. Jahrb. Ph.* xx. 330.

Benzine as an Insecticide.—A mixture of 10 parts benzine, 5 parts soap and 85 water, has been very successfully used by Gille, to destroy the parasites which infest dogs. It has also been used with good results in veterinary practice, as an application in certain diseases of the skin; and thus diluted, is found to answer better than when used pure.—*Bull. de Ph. de Brux. N. Jahrb. Ph.* xxi. 86.

Preservation of Lemonade.—The spontaneous change which this liquid undergoes, and the early deposition of a granular salt, when prepared in a concentrated form, prevents its being kept longer than a few days. Ladi, has suggested the employment of the sulphite of magnesia as a means of preserving it for a longer time; the gradual oxidation by which it becomes converted into the sulphate of magnesia, appearing to prevent the alteration. A very small quantity is said to be sufficient. *Schweiz. Zeitsch f. Ph. N. Jahrb.* xxi. 39.

Preservation of Fresh Meat, &c.—Several specimens of fresh meat and fish, preserved by the following process, were exhibited during the late London Exhibition, by R. Jones and F. Trevithick, of London, and retained during the whole of the exhibition their fresh appearance. The uncooked meat is placed in a strong tin vessel, from which the air is exhausted by means of an air pump. A small quantity of sulphurous acid is then introduced which is rapidly absorbed by the meat, when the vessel is filled with pure nitrogen gas, and hermetrically sealed. (Carbonic acid, which is more easily prepared, might perhaps answer as well.) *Dr. A. Geyger, in N. Jahrb. Ph.* xx. 215.

Estimation of Copper in vegetable extracts, food, &c.—Hager

dissolves or exhausts the substance to be examined in water containing acetic acid, and in the acid liquor immerses a stout platina wire, carrying at its lower end a piece of iron wire. After one to three hours immersion, copper, if present, is deposited upon the platina as a brownish coating; which is then removed to a test tube, in which has been placed four or five drops of pure nitric acid of 20 to 25 per cent. The copper thus dissolved, may now be made evident in the solution by its producing a blue color with an excess of caustic ammonia. In this way the presence of this metal has been detected in solutions in which neither ammonia nor ferrocyanide of potassium gave any reaction. This method is particularly applicable to vegetable extracts and juices, in which, on account of tannic acid and similar matters, iron alone gives but doubtful results. —*Ph. Centralhalle. N. Jahrb. Ph.* xx. 222.

Detection of the adulteration of arrow root with potato or corn starch.—According to J. F. Albers, (*Arch. d. Pharm.*,) this is effected with certainty, by means of their behaviour towards hydrochloric acid. When one part arrow root is shaken with three parts of a mixture of two parts hydrochloric acid of 1·12 sp. gr. and one part of distilled water, at ordinary temperatures, for about three minutes, no reaction is observable. But should corn starch be subjected to this treatment, it becomes changed into a gelatinous, translucent, and finally into a semi-fluid mass. Potato starch behaves in the same way, with the production of an easily recognized and characteristic smell.

If a mixture of arrow-root with one or more of these substances is to be dealt with, the arrow-root is to be separated by treating the whole for two to three hours with the hydrochloric acid, by which the arrow-root becomes soluble, and may be filtered from the remaining softish mass, which, when washed, dried in the air, and weighed, shows by the loss in weight the amount of arrow-root present.—*Viertlijh. Ph.* xiii. 276.

Tobacco Seed has been examined by F. M. Brandt, without finding either propylamia or nicotia. The latter alkaloid was discovered in the solid matter obtained by evaporating the aqueous extract, but was believed to be a product of the decomposition of some of the protein-like substances. The following are

stated to be the organic constituents of tobacco seed, viz.: a fixed drying oil, protein-like substance, resin, sugar, gum, tannic, and oxalic acids. No less than 200,000 seeds were calculated to have been produced by a single plant.—*Viertilj. Ph.* xiii. 161.

The musty smell which grain harvested in damp weather acquires, has been removed by Chalambel, by exposing it in the granaries to the drying influence of quicklime, (which however should be allowed to come in contact with it,) in the proportion of one part lime to fifty of grain.—*Zeitsch. f. deut. Lander. N. Jahrb. Ph.* xxi. 42.

NOTE ON AN ALKALOID OBTAINED FROM THE SEEDS OF RICINUS COMMUNIS, OR CASTOR-OIL PLANT.

By Professor Tuson.

It is well known that certain parts of several plants belonging to the Natural Order *Euphorbiaceæ*, as well as various pharmaceutical preparations obtained therefrom, have been long employed in medicine as remedial agents; and that, notwithstanding this circumstance, our knowledge respecting the chemical constitution and physiological action of the active principles residing in such bodies is even at the present day in an exceedingly unsatisfactory state.

For a considerable period I have devoted much of the time which I could snatch from that occupied in my regular professional pursuits to attempts at isolating the active constituents of the seeds and oils of castor and croton, of gum euphorbium, and of cascarilla bark, *i. e.* the bark of *Croton eleuteria* or of *Croton cascarilla*. Now although, as yet, I have not succeeded in accomplishing the particular object which I had in view when I commenced my experiments, I have nevertheless discovered several substances possessing chemical if not therapeutic interest, and it is one of these proximate principles which I have separated from the seeds and oil of *Ricinus communis* that I wish to partly describe in this communication. The compound to which I refer is an alkaloid, and I have provisionally named it ricinine.

Preparation of ricinine.—Crushed castor-oil seeds are exhausted by successive quantities of boiling water, and the matters soluble in water separated from the oil and other insoluble material by filtration through wet calico. The filtered liquid thus obtained is then evaporated to dryness over a water-bath, and the extract produced is treated with boiling alcohol so long as it exerts any solvent power. The alcoholic solutions are allowed to cool, when a small amount of a resinoid body precipitates. This is separated by filtration, and the filtered liquid is concentrated to a small bulk and allowed to stand all night. The next morning a mass of almost white crystals are found to have deposited from the alcoholic solution. These crystals are the new alkaloid, *ricinine*. It may be obtained perfectly pure by recrystallization out of alcohol and decolorizing by animal charcoal.

Properties of ricinine.—Ricinine crystallizes in rectangular prisms and tables. When placed on the tongue, it slowly manifests a feebly bitter taste, resembling somewhat that of bitter almonds. Cautiously treated on a microscope slide, ricinine melts and forms a perfectly colorless and mobile fluid, which on cooling solidifies into a whorl of acicular crystals. Heated between two watch-glasses, a sublimate is obtained, which appears to be unaltered ricinine. Strongly heated on platinum foil, ricinine first melts and subsequently burns with a highly luminous and fuliginous flame.

The best solvents for ricinine are water and alcohol; benzol and ether dissolve but a small quantity of the alkaloid. Heated with solid hydrate of potash it evolves ammonia, thus demonstrating the presence of nitrogen.

Concentrated sulphuric acid dissolves the alkaloid without coloring it, and the addition of bichromate of potash simply causes the development of a green color.

Iodic acid is not deoxidized by ricinine, even when these substances are warmed together.

Concentrated nitric acid dissolves ricinine without evolving red vapors, although heat be applied. On evaporating the solution thus produced to a small volume and allowing it to cool, groups of transparent and colorless acicular crystals develope. These crystals are rendered opaque by the addition of water.

Concentrated hydrochloric acid dissolves ricinine, but the hydrochlorate of the base, which is doubtless produced in this reaction, appears to be readily decomposed both by evaporation and dilution. A solution of ricinine in hydrochloric acid does not give a precipitate with a concentrated aqueous solution of bichloride of platinum, but on evaporating a mixture of these bodies well-defined octahedra and modifications of octahedra having a deep orange color crystallize out.

On mixing together cold saturated aqueous solutions of ricinine and perchloride of mercury no change is at first observed, but if the mixture be allowed to stand for a few minutes a mass of beautiful silky crystals, arranged in radiate tufts, is formed; which is so solid that the vessel in which the experiment is performed may be inverted without any fear of its contents falling out. The mercurial compound of ricinine is soluble in water and in alcohol, menstrua from which it may be purified by crystallization.

If ordinary castor-oil be shaken up with water, the water decanted and evaporated to dryness, a small quantity of resinous residue is left, which, when treated with boiling benzol, partly dissolves. If the benzolic solution of this residue be allowed to evaporate spontaneously, a small quantity of white crystals are obtained, which, so far as one can judge from their physical properties, are ricinine.

Neither ricinine nor the resinoid body which falls when the alcoholic solution of the aqueous extract of the seeds is allowed to cool, is the purgative principle of castor-oil or of the seeds from which it is expressed, for I administered two grains of each of these educts to a rabbit more than a month ago, and the animal has not evinced the slightest inconvenience, temporary or otherwise. The true active principles of officinal Euphorbiaceæ I am still seeking, and the nature of the results which I have already obtained, induce me to indulge in the hope that before long I shall be enabled to publish an account of them. I may be permitted to conclude this imperfect account of ricinine by stating that I have obtained a similar if not identical body from croton seeds, and, so far as I have yet discovered, differing in several important characters from those described as belonging to cascarilline, an alkaloid discovered by

Brandes in the bark of *Croton eleutria* or *Croton cascarilla*, both plants belonging to the Natural Order Euphorbiaceæ.—*London Pharm. Journ.*, from *The Veterinarian*.

ON THE USE OF QUINOVIC ACID (CINCHONA BITTER) IN MEDICINE.

By. Dr. J. E. De Vry.

When I found, in 1859, that all parts of the different species of *Cinchona* growing in Java contained quinovic acid, of which I detected in the wood of the roots of *C. Calisaya* so much as 2·57 per cent., it appeared to me very probable that the tonic properties of some preparations of bark, particularly of an aqueous infusion, such as the *Infusum Corticis Peruviani cum Magnesia frigide paratum*, which formerly was frequently prescribed by many Dutch physicians, might be at least partially ascribed to quinovic acid. I therefore employed the wood of several dead cinchona plants at my disposal for the preparation of this acid, which, by order of the Governor-General, was, at my request, experimentally tried by the medical staff of the Army. The official report on these experiments was so favorable, that the chief of the medical staff, Dr. Wassink, requested a further supply, in order to continue the experiments on a larger scale. As I had no more material at disposal with which to prepare quinovic acid, I wrote to my friend Mr. A. Delondre, at Havre de Grace, who was kind enough to send me not less than five kilogrammes of the crude acid from his manufactory of quinine. Although my laboratory in Java was perfectly adapted for all kinds of chemical researches, the purification of such a quantity of a substance famous for its bulky volume gave me not a little trouble, but at length I succeeded in preparing two kilogrammes of quinovic acid sufficiently pure for medical use. This quantity was used by the medical staff of the Army for experiments on a larger scale in the hospitals of Java and Sumatra. The general report on these experiments, the result of which was very favorable, has been sent by the chief of the medical staff, Major-General Dr. G. Wassink, to the Governor-General of Dutch India, under date 5th March, 1863. It

appears from this report that the quinovic acid has been used in the hospital of the west-coast of Sumatra in sixty-five cases of intermittent fever, with or without complications, and in the great majority of cases with perfect success. In the hospital at Samarang, it has been used with the same success in forty-five cases, and it is with great satisfaction that I quote the following passage from the report respecting the experiments at Samarang:—

"The application of quinovic acid in diarrhœa and dysentery was made in consequence of the observation of its physiological action in diminishing the secretion of the intestines, which was attributed to a diminution of the peristaltic motion. In this aspect also the results were very satisfactory, and it is therefore a new property of the quinovic acid discovered, which agrees with the tonic properties which have been ascribed to it by Dr. de Vry."

It appears therefore not only that my suggestion about the tonic properties of the quinovic acid is well founded, but also that it is a remedy against intermittent fever. I therefore venture the suggestion to use the leaves of cinchona in British India against jungle-fever, which is in many districts a real plague. If the leaves are collected in the different cinchona plantations, which can be done without great cost, a tincture could be prepared from them with *proof spirit*, in which menstruum quinovic acid is easily dissolved, but not chlorophyll and some other inactive substances. I have much expectation that the proper use of such a tincture as a prophylactic would prevent many cases of jungle-fever in the localities where they are endemic. As the manufacturers of quinine throw away every year some hundred pounds of a substance containing quinovic acid, there is abundance of material for further experiments. I have found besides that the so-called *naucleic acid*, discovered by Mr. C. Bernelot Moens, military pharmaceutist at Batavia, in a species of *Nauclea*, is identical with quinovic acid; and as, according to my investigations, all the species of *Nauclea*, which are plentiful in the forest of Java, contain this acid in their bark, we have here another source whence an abundant supply could be obtained.—*London Pharm. Journ.*, July 1, 1864.

TÆNICIDE PROPERTIES OF PEPO.

With Report of a Case in which it was Successfully Used.

By E. Ingals, M. D.

Pepo—made officinal by the Pharmacopœia of 1860—has been known now for more than a century, to possess properties destructive to the tapeworm. The influence of the doctrine of signatures is said to have first suggested its use for this purpose. Inasmuch as there was observed to be a degree of resemblance between the pumpkin seed and the joints of which the body of the worm was made up, it was surmised that it would be the proper remedy to be used with a view of ridding the system of this troublesome parasite—and as fortune would have it, a doctrine that has its foundation only in ignorance and superstition, was in this instance the parent of truth. But though the pumpkin seed has been so long known as a remedy for tapeworm, yet it has never been extensively employed for this purpose, especially in this country. Its use was introduced into the United States by Dr. J. A. Smith, of Boston, in 1850.

Since that time a considerable number of cases of its successful employment have been reported in our medical journals—such reports, coming mostly from physicians practising in the Eastern portion of the Republic, and we have reason to think that the remedy has been used there more than at the West or South. The seeds contain a fixed oil, which may be obtained from them by expression, and to this is said to be due their medicinal virtue. Some cases of tapeworm have been successfully treated by the administration of this oil, a fluid ounce being given at one dose, to be followed in two hours by some active cathartic; but the oil is not known to possess any advantages over the seeds in substance.

The case in which we used this remedy occurred in a healthy boy, eleven years old, who, for two months before his parents brought him to me, had been voiding a number of joints of the worm daily, and his previous symptoms, as related to me, justify the conclusion that he had been afflicted with it more than a year, though no treatment had been resorted to, as they did not suspect the nature of the malady. The health of the child did not suffer, except that he was troubled somewhat at night by

a cough of a spasmodic nature, and the parents noticed that this was always much worse when the child took milk for his supper, and likewise that prompt relief was sure to follow the taking of some bitter substance. I directed that ℥j of the pumpkin seeds should be freed from their shells, and then with ℥iv of sugar and ℥vj of water, to be made into an emulsion, and of this one-third was to be taken every hour, after fasting from supper until morning, and in one hour after the last dose ℥ss of castor oil. As this failed to act on the bowels, three hours after, ℥j more of the oil was given, which produced only a mild laxative effect, and this not until three hours after it was taken, bringing away only about thirty segments of the worm. This was on Sunday, and not wishing to keep the boy from his school, I postponed further treatment until the following Saturday, when I ordered the same amount of emulsion as before, directing that one-half of it be given in the morning, fasting, the remainder in half an hour; and one hour thereafter, ℥xij of the liquor magnesiæ citratis. In a little more than two hours this occasioned active catharsis; the first three dejections containing only disjointed segments of the worm, but the next brought the entire parasite, a tænia solium, twenty-two feet in length but not dead.

I have reported this case, not as anything new, but hoping it may have some influence to induce others to test the virtues of this article. To obtain a medicine that shall be efficient for the cure of disease, at the same time that it is absolutely innocuous to the patient, is a desideratum greatly to be desired, but not always found. Of this remedy it is known that its use is neither unpleasant nor injurious, and it remains only to demonstrate its efficacy, and it is not unlikely that experience may prove it to be the best remedy for tapeworm, all things considered, that we possess.

The following are some of the advantages that the pepo may perhaps justly claim over other tænifuge remedies in common use, as the male fern, the bark of the pomegranate root, kousso, oil of turpentine, etc., 1st. To the patient it is entirely harmless and is not unpleasant to take. 2d. In this country it may always be obtained, and of a quality known to be good. 3d. To us it is indigenous, and other things being equal, such remedies

should be preferred before those which are imported, especially in times like the present, when the whole nation should husband every resource, however trifling, for martial purposes.

Some recommend that the remedy be given in large quantities, and during a number of days, and without the adjuvant of a cathartic, for the emulsion itself when thus administered acts as a laxative; but we think an active cathartic should never be omitted, for its operation is capable of expelling a worm enfeebled by the effects of the medicine, but not to a degree to insure its death if left in the alimentary canal. It may be proper to say, that among the people who have experience with domestic remedies, there is an opinion somewhat prevalent, that the pumpkin seed is an efficient remedy for the destruction of the ascarides lumbricoides, but I am not aware that this has been confirmed by the observation of the profession.—*Chicago Med. Journal.*

ON THE ROOT-BARK OF THE CINCHONÆ.

By J. E. Howard, F.L.S.

A letter from a gentleman owning a district in New Grenada, containing trees of Cinchona, has been put into my hands by Mr. Markham. It shows very satisfactorily that the reprobation of the practice of extirpating these trees, which has found utterance in England, is beginning to produce a salutary effect in South America.

The letter is from Don Narciso Lorenzano, and is dated Bogota, March 4th, 1864. He writes to his correspondent (— Griffiths, Esq.) as follows:—

"I have to thank you for having sent me a copy of the 'Edinburgh Review' of last year, in which I have had the satisfaction of reading the article on the cultivation of the *quina* trees in the East Indies. Permit me to congratulate you on the successful result of this undertaking, which partly ensures the supply of so precious a drug for the future. It appears to me that the principal motive which induced the government of India to commence this cultivation, after overcoming so many difficulties, was the fear that the *quina* trees would be extirpated, in consequence of the disorder and waste

that is allowed in the woods, where they are destroyed by the barbarous method of pulling up the roots. Fortunately this destructive method, which, without any doubt, would extirpate this precious plant in a few years, is only practised in the forests of Pitayo, where it is due to the immoderate desire of making money which has taken possession of the Indians who own the greater part of the land. But in none of the other establishments for the collection of bark, in this country, has a similar scandal been repeated. On the contrary, beneficial rules are observed for the conservancy of the woods, more especially in those where I have a proprietary interest. The method consists in leaving a part of the trunk, about three feet in height, whence shoots may sprout, and in clearing away the surrounding trees to enable the rays of the sun to penetrate. By this means most of the trees that are cut down quickly shoot up, and the rays of the sun penetrating to the cleared ground, the seeds which fall from the tree germinate freely. Thus we have the satisfaction of seeing, in the forest worked on this principle, that the trunks of cut trees send out new shoots, and that the young plants grow vigorously. This result gives us full confidence that the good kinds of *quinas*, which exists in the country, will be permanently preserved.

"From the above considerations we may conclude that there need be no fear that humanity will see itself deprived of this precious medicine, seeing that as well in Bolivia as in Peru, Ecuador, and New Grenada, the rule of cutting the bark according to a fixed plan is observed, and care is taken that the woods are replenished with increased numbers of plants of the best species, while some experiments have been made in forming plantations on land where the best conditions for their growth are found. From all this we hope that in a few years we may see magnificent results."

There can be but one opinion as to the inexpediency of continuing the "barbarous practice" referred to, whatever comes of the question as to the comparative produce of the root-bark. My observations apply to the root-bark of the Calisaya as found in commerce accompanying that of the trunk and branches. The low price which this brings, amid all the keen competition of the bark sales here, is sufficient evidence of its inferiority. I

have just examined a favorable specimen, which is probably still unsold. This contains some better bark of the trunk mixed with a preponderance of that of the root. Separating this last, I found that it would be worth about half the price of flat Calisaya.

This question ought certainly to be set at rest, as it easily might be by the sacrifice of some half-dozen trees out of the million plants of the *Cinchona Pahudiana* which the Dutch possess in the island of Java. If, from the root-bark of these a competent proportion of commercial sulphate of quinine can be obtained to defray the expense of cultivation, then the important fact of their value will be established; but I believe this has not yet been done.

In time for the next number I hope to send a paper on the so-called "bark from the root of *C. lancifolia*" which is really a very interesting new variety of the *C. Pitayensis*—the *Pitaya roja* of commerce.—*London Pharm. Journ.*, July 1, 1864.

PROPERTIES OF SILICATES.—NEW ANTIDOTES.

To the Editor of the Chemical News.

SIR,—Gelatinous silica being known to be soluble in alkaline solutions such as those of caustic soda, it might fairly be presumed that it would also be soluble in an alkaline silicate, although I am not aware of this having been published as a fact.

But the same property could not probably have been anticipated of the silicates of the earth and metals. The silicate of magnesia, for example, in the gelatinous or recently prepared state, is not soluble in a solution of caustic soda, but readily so in a solution of silicate of soda; and the latter rule holds good through all the series of silicates.

The solvent power of the alkaline silicates seems, therefore, to be altogether different in degree and in other important particulars from that of other alkaline solutions. Hence through this property we have soluble glass in as great variety and of tints as various and delicate as we have in stained glass. The soda silicate of cobalt is of a beautiful rose color—that of chromium green, &c. But the tints of the metallic-colored

silicates are modified by solution in the colorless compound soluble silicates—that of copper, for instance, in a soda silicate of magnesia, is different from that of its solution in silicate of soda.

The above fact will, I think, be sufficient to indicate the importance of a true knowledge of the compound soluble silicates in geology and mineralogy, and lead to a more exact explanation of the color of a great number of minerals and of many of the precious stones.

The silicic acid of the alkaline silicates again displaces the carbonic acid in carbonates, even at the ordinary temperature, and very rapidly by the aid of heat. This fact will aid towards explaining the formation and composition of many rocks, and be a guide in the production of artificial stones in endless varieties.

As regards agriculture, the ammonio-silicates seem not only to be the most soluble, but also to possess the greatest solvent powers of all the alkaline silicates. When we add to the series the phospho-silicates, also highly soluble, it seems to me that a field of investigation is laid open worthy of the highest science of the day in the department of agricultural chemistry, and which, if followed, is likely to lead to practical results of vast importance, and to a true solution of many things that have not hitherto been satisfactorily explained.

There is still another field open to investigation with these interesting compounds, namely, the use of them as antidotes to poisons.

For this purpose I would suggest the soda silicates of magnesia, alumina, and lime. In case of any poisonous mineral salt being taken, an instantaneous precipitation of an insoluble silicate would occur in the stomach, and probably without the least injurious effect to the coats thereof, by prompt administration of a diluted solution of any of the above-named compound soluble silicates, or of a solution of silicate of soda saturated with gelatinous silica. It is a question which I have commenced investigating, whether the alkaloids may not be rendered insoluble, and therfore inert, through their means.

I am, &c.,

Bangor, June 28. HENRY ELLIS.

MANUFACTURE OF FATTY ACIDS FOR CANDLE AND SOAP MAKING.

By H. M. Mège-Mouriès.

My researches on amylaceous grains, especially wheat, have furnished the means of substituting for brown bread, in Paris, a cheaper and more nourishing kind.

Analagous studies on oleaginous grains have altogether modified the economical conditions of two great manufactures. I will proceed at once to the results.

In oleaginous grains during germination, as in the animal economy during life, neutral fats pass, before undergoing any other modifications, into the state of very mobile globules, presenting a very large surface to the action of reagents.

In this globular state, fatty bodies manifest peculiar properties; we will mention those directly connected with the subject of this memoir.

1st. A fatty body in the ordinary state—suet, for instance—quickly becomes rancid by exposure to damp air: in the state of globules, on the contrary, it will keep for a long time, either liquid or dry, and as a kind of white powder (I possess specimens prepared in June, 1863).

The globular state may be produced by yolk of egg, bile, albuminous matters, &c.; for industrial purposes, it is produced by mixing tallow, melted at 45°, with water at 45°, holding in solution from five to ten per cent. of soap.

2d. Tallow, in the ordinary state, like other fatty bodies, resists washings in hot soda ley, and combines with it only with very great difficulty; in the globular state on the contrary, it immediately absorbs this washing out, in quantities varying with the temperature, so that it is possible, so to speak, to distend and contract each globule by lowering or raising the temperature between 45° and 60°.

It is easy to understand that in this case each globule of the fatty matter, attacked on all sides by alkali, abandons its glycerine with such rapidity as speedily to produce a liquid in which each globule is a perfect soap globule, inflated with lixivium. This can be effected in two or three hours.

3d. These saponified globules, when exposed above 60°, gra-

dually reject the lixivium with which they were distended, retaining only the quantity of water always entering into the composition of soap. They then become transparent, semi-liquid, and their confused mass forms a layer of melted soap above the lixivium, which contains the glycerine.

4th. The saponification of this mass is so complete that to extract the stearic acid, it is only necessary to dilute the soap in cold water, and acidulate with a quantity of sulphuric acid proportioned to the soda. The fatty acids, mixed with water charged with sulphate of soda, may be separated by melting and pressing when cold, to obtain stearic acid, inodorous and fusible at from 58° to 59°, and almost colorless oleic acid.

These results, tested by industrial experience, recall the time when M. Chevreul, after his remarkable investigation of fatty bodies, believed that stearic acid could be economically produced with oleic acid. Unfortunately, all attempts to carry out this idea have failed.

Thus lime has been employed, the soap of which decomposes only by very strong measures, giving rancid, colored oleic acids, whilst producing a loss in the deposits of sulphate of lime, without counting a number of costly operations; then came distillation, which increased the loss from 10 to 15 per cent., and lowered the value of the product so much, that one part of stearic acid disappeared, and the oleic acid was rejected on account of its odor, its color, and its inapplicability for making an agreeable soap; then came the splitting up of the fatty body by water under pressure; but then the incomplete saponification and diffused crystallization became an obstacle to all subsequent operations. Finally, instead of pure water, a small proportion of lime, soda, or soap was put in the digester. The saponification still remained incomplete; the decomposing and pressing operations gave the same results in this as in the preceding instances, yielding only a kind of stearic acid, with a very low fusing point, and a red oxidised oleic acid to the value of 85 or 88 frs., while the olive oil was worth 130 and 135 frs. (These various operations have been described by MM. Pelouze, Tilman, Melsens, Podwer, &c.)

In the new operation all this is reversed; the loss is *nil*, being limited to the subtraction of the glycerine; the quantity of

fatty acids obtained is 96—97 per cent. The operation is carried out in a single day; thus, operating on 2000 kilogrammes, three hours are required for the saponification, one hour for the decomposition, three hours for the fusion and settling, for the crystallization eight hours, for pressure when cold in a double press four hours, making altogther nineteen hours for the operation; and as the crystallization takes place in the night, there is in effect only eleven hours' work.

By this simple method we effect not only great economy in labor, fuel and product, but also, thanks to the lowness of the temperature throughout, we obtain an inodorous, unaltered stearic acid, fusible at 58°—59°, and an oleic acid, equal, if not superior, to the best oils used in soap making.

It is obvious that this manufacture is revolutionized. Fatty bodies are now treated to produce stearic acid, leaving oleic acid as residue; in future, the same fatty bodies will be treated to obtain oleic acid, and the price of stearic acid will be lowered by the value of the oleic acid obtained.

Thus M. Chevreul's prognostications will be realized, and the products of France, where this manufacture originated, will no longer be inferior to those of foreign countries.

Soaps.—The best white soap may be made from pure oleic acid, either alone or mixed with other oils. None but neutral oils can be used, such, for instance, as are now used for Marseilles soap. In the first case—that is to say, when oleic acid only is used, the glycerine being removed—it suffices to saturate this acid by a feeble washing. The soap globules form immediately, and no delay is required before fusing them. On the contrary, when oleic acid is mixed with other oils, or when only neutral oils are employed, the process described for suet is used. The fatty bodies are converted into the globular state, the globules being kept in motion by a hot and salt lixivium until complete saponification. The saponified globules are separated by fusion, the soap is melted, separated from the lixivium, and poured into the moulds where it solidifies by cooling. The operation requires six hours' effective work, and in twenty-four hours a soap is obtained as perfect as neutral, and lathery as old Marseilles soap. (The specimens of silk presented to the Academy had been comparatively treated at the Gobelins

manufactory with Payen's white Marseilles soap more than eight months old, and with soap made only three days by the process above described.) Saving of time is not the only advantage of this process. It is obvious that each globule, being separately attacked both inside and out, without becoming agglomerated or cooked *en masse*, no portion escapes saponification. Moreover, caustic soda, acting at a medium temperature, does not alter the fatty bodies, as in the ordinary processes, in which part of the oils is carried off in the colored and frothy lixivium, thus entailing a notable loss.

It results, then, that in twenty-four hours a soap can be made, in greater quantities, as pure, as neutral, whiter, and lathering better than the best white Marseilles soap, requiring for its manufacture thirty or forty days, and then kept several months. These researches I hope will tend to check the introduction of a host of injurious products sold under the name of soap to the injury of the needy population; and I further hope that the manufacture of soaps and of stearic acid may be raised from the comparatively present low state into which it has fallen.—*London Chemical News*, June 18th, 1864, from *Comptes Rendus*, lviii., 1864.

THE PHARMACOPŒIA [BRITISH] PROCESS FOR CITRATE OF IRON AND QUININE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having unsuccessfully tried to prepare some "Citrate of Iron and Quinine" according to the process described in the new British Pharmacopœia, and having, after repeated trials, come to the conclusion that the process was a fallacious one, allow me to ask you the favor of publishing in the next 'Pharmaceutical Journal' the following receipt of mine, which not only gives an elegant preparation, but also a product similar in every respect to that found in commerce.

I am, Sir, yours obediently,

Mauritius, May 6th, 1864. E. FLEUROT, M.P.S.

FERRI ET QUINIÆ CITRAS.

Take six fluid ounces of a *saturated* solution of citrate of *per-*

oxide of iron,* made of such a strength that this quantity shall exactly represent six drachms of the anhydrous salt.

To such a solution, heated by the water-bath, add one drachm of citric acid previously dissolved in one ounce of distilled water, and immediately afterwards add at once the quantity of *quinia* freshly precipitated by solution of ammonia from two drachms of disulphate of quinia. Continue the application of heat, and stir the mixture constantly until all the quinia is dissolved. Solution of ammonia (P.L.) is then added drop by drop in suf-

* The saturated solution of *citrate of peroxide of iron* is made by saturating at the heat of the water-bath a solution of citric acid with freshly-prepared *hydrated sesquioxide of iron*, until no more oxide is dissolved in the solution of citric acid. The excess of oxide of iron is then removed by filtration, and the liquid evaporated to such a strength that every fluid ounce must represent one drachm of anhydrous citrate of iron.

[NOTE.—In order that our readers may appreciate this paper we append the following condensed view of the process of the British Pharmacopœia for this salt:—

Take of Solution of Persulphate of Iron, 3 fluid ounces;
Sulphate of Iron, an ounce (Av.);
Solution of Soda, 36 fluid ounces;
Citric Acid, 2½ ounces (Av.);
Sulphate of Quinia, 380 grains;
Distilled Water, Dilute Hydrochloric Acid, Solution of Chloride of Barium and Solution of Ammonia, of each a sufficiency.

Dissolve the sulphate of iron in 10 fluid ounces of the water, mix with it first the persulphate solution and then the solution of soda, stirring constantly; then wash the precipitates in a muslin filter till tasteless. Dissolve the citric acid in 20 fluid ounces of distilled water, and dissolve in it the precipitated oxide of iron, by aid of a water-bath heat.

Dissolve the sulphate of quinia in half a pint of water by aid of sufficient muriatic acid, and add solution of chloride of barium till all the sulphuric acid is precipitated; then filter, add a slight excess of ammonia, collect the precipitated quina on a filter and wash it thoroughly.

Lastly, dissolve the quinia in the solution of citrate of iron on a water-bath and evaporate in thin layers on glass at a temperature below 212° F.

The writer has adopted a process analogous to that in the U. S. Pharmacopœia, except in quinia strength and in the introduction of ammonia to give the greenish-yellow appearance to the salt; our salt being reddish-brown when in thick scales, and yellowish-brown in very thin scales.—EDITOR AMER. JOURN. PHARM.]

ficient quantity (about 2 fl. oz.) until the desired yellowish-green color is obtained. The mixture must be stirred up briskly after the addition of each drop of ammonia.

Great care should be taken not to add an excess of solution of ammonia; the solution must, on the contrary, be slightly acid to litmus paper. The liquid is then left to evaporate on the water-bath until it acquires a syrupy consistence, when it is spread with a brush on glass plates, and placed in a stove to scale.

NOTE.—It sometimes happens that the solution of the salt in water has a milky appearance; this shows that there was not a sufficient quantity of citric acid in the preparation; it is obvious, then, to try a little of it previous to its concentration. For this purpose, take a small quantity of the liquid, dry it on a glass plate, and examine the salt as to its solubility and transparence. If, on dissolving the salt in water, the solution is not found to be quite clear, add to the preparation, while it is on the water-bath, a few grains of powdered citric acid, and repeat the process of drying, etc., etc., until you obtain a perfectly transparent solution.—*London Pharm. Journ.*, July 1, 1864.

THE DETECTION, DISTINCTIVE CHARACTERISTICS, AND ESTIMATION OF NATURAL ORGANIC ALKALOIDS.

BY M. ALFRED VALSER.

[The following notice of a recently published thesis will probably supply our readers with a few useful hints on the subject of which it treats.—ED. C. N.]

The thesis is divided into three parts. The first gives the means for filling up the hiatus in Stas's process for morphine, and indicates a general reagent for alkaloids. The second part treats of the reactions peculiar to each. The third part concerns the determination of their equivalents.

In the first part of his paper M. Valser clearly shows the insufficiency of Stas's process, an insufficiency already pointed out by MM. Lefort and Revcil relative to the detection of morphine in poisoning cases. Being insoluble in ether, morphine could not be obtained free by that method. The author has

endeavored to substitute for common ether a solvent capable of obviating this inconvenience. This substitute he has found in acetic ether, which dissolves morphine at least as well as alcohol. After devising a method for rectifying commercial ether, he makes use of this solvent in the following way:—

The substances to undergo examination having been treated as far as possible by Stas's method, he adds to the residue, already exhausted by ordinary alcohol, a certain quantity of potash and acetic ether, which take up any morphine there may be remaining. On evaporating separately the simple etherized liquid and the acetic ether liquid, the morphine left in the residue left by the latter is recovered, all other vegetable bases being included in that which furnishes the simple ether. At this point it is necessary to ascertain whether these residues are indeed the alkaloids. Their usual reagents, such as tannin, chloride of gold, iodised water, phospho-molybdic acid, &c., not being exempt from drawbacks, the author prefers the reagent used by M. de Vry in researches on atropine and strychnine; that is to say, double iodide of mercury and potassium. M. Valser finds it possesses the invaluable property of entirely precipitating alkaloids, it being so exquisitly sensitive to their presence as to indicate $\frac{1}{100000}$ of strychnine in a liquid. Moreover, this double iodide precipitates none of the other principles contained in the vegetables, except the albuminoid matters; but the presence of these matters is not encountered, since they are eliminated by the ether in Stas's process.

These facts once admitted, the author makes use of this reagent, whose general utility and sensibility is incontestible, to establish the presence of alkaloids in oils of belladonna, hemlock, &c., which before was only suspected.

The second part is devoted to researches on the distinctive characteristics of alkaloids. Finding the most characteristic reactions on these matters produced by oxidising bodies, the author tried each of them successively at various temperatures; sulphuric acid alone or associated with binoxide of barium or binoxide of lead; hydrochloric acid with binoxide of barium; chloride of gold and caustic potash. With each he elicited distinctive characters.

The third part comprises a study of the estimation of alka-

loids and the determination of their equivalents. "Observing with what facility the solution of double iodide of mercury and potassium detected the least trace of alkaloids, the author was induced to examine whether the resulting combination could be exactly defined, and whether he could obtain a precipitate invariable in weight and characteristic of each of them." Such, in effect, is the result he obtained whilst experimenting on a certain number of vegetable bases. The high equivalent of the reagent employed, the great density of the alkaloid precipitates, their insolubility in aqueous liquids, even when acidulated, enabled him easily to determine, not only the composition of these precipitates, but the equivalents of the alkaloids themselves.

This new method leads M. Valser to conclude that we must revert to the old equivalents for quinine and cinchonine, which are but half those since adopted. He also found by the same means that quinidine is isomeric, not polymeric, with quinine.

The author desired to apply his reagent for the estimation of vegetable alkaloid matters, but the presence of albuminous and extractive principles vitiated the results. Further, perceiving that the processes used in these researches, besides being insufficient, occupied too long a time, he successfully modified them by combining the successive action of the proper solvents in presence of lime, which isolates the alkaloids, and of tannin, which assists in decolorising the liquids. This process, too long to be here described, greatly shortens the operation, and isolates purer products.

Such is the summary of M. Valser's paper. He has not feared to attack excessively delicate toxicological and chemical questions. Without diminishing the precision of Stas's process, he has, by extending it, rendered it applicable to the research of morphine. He has generalised a valuable reaction to isolate alkaloids by employing double iodide of mercury and potassium, which precipitate them so effectively. This reagent has demonstrated the presence of some vegetable bases in certain medicinal oils. He has besides discovered some new reactions for distinguishing the principal organic alkalies one from another. Then proceeding methodically, he utilised the valuable iodhydrargyrate of potash for the rigorous determination of the equivalent of alkaloids, rectifying some, changing others, all deduced

from numerous correct and unexceptionable analyses, and finally crowned all by planning a general process for the estimation of all matters containing alkaloids.*—*Chem. News* from *Journal de Pharmacie et de Chimie*, xliii., 49, 68.

EXTRACT OF MALE FERN.

By W. E. Bowman, M. D.

The ethereal extract is the preparation of male fern usually employed for the expulsion of tape worm, and is the only one given in the new Pharmacopœia. It is, as often styled, the oil of male fern; and is made by exhausting the root, by percolation with ether, which is afterwards distilled off, leaving a dark, oily liquid of the consistence of treacle. We have always been very successful with this extract, and generally prescribe for our patient two one drachm doses; directing the first to be taken in syrup or mucilage after a day's fast, and the second in three hours, with an ounce of castor oil. And if, on thorough search, the head cannot be discovered to have passed away with the evacuations, nothing but a little gruel is allowed, and the dose with the oil is repeated the next morning.

Beale in his work on the Microscope (p. 360) directs from two to four drachms as a dose; Pareira ($\frac{2}{3}$s) says from 30 m. to a drachm; whilst Christison (496) gives but 18 m. at night, and a similar dose in the morning.

We have been led to this subject on reading some excellent remarks in the British Medical Journal, of the 9th of April, by Dr. J. D. Rendle, of Brixton, Surrey, which we here subjoin. It will be perceived that his mode does away with the most objectionable part of our treatment, namely, the fasting.

"In every case of tape-worm which I have treated for the last three years, the mode of preparing the patient, the dose of the male-fern, and the way in which it was given, have been the same; all of which I will now briefly describe. The patient is sent to the infirmary, and late in the evening on the day of

[* M. Valser does not notice the paper of Prof. F. F. Mayer, published in the Proceedings of the Amer. Pharm. Assoc., 1862, nor the extension of it in the American Journal of Pharmacy for January, 1863, where this process is practically applied by Prof. Mayer, in testing the preparations of Belladonna, Aconite and Stramonium, etc.—Ed. Am. Jour. Pharm.]

admission, the treatment is commenced by giving an ordinary two-ounce black draught; on the following day all solid food is forbidden, but an almost unlimited supply of beef tea is allowed; even milk, which is said to be the favorite food of the worm, I purposely forbid. On the evening of this day, half an ounce of castor oil is administered; and early on the following morning, about thirty-four hours after taking the black draught, two fluid-drachms of the oil of male-fern are given, suspended in two ounces of thin mucilage of acacia. The result, without an exception, in every case which I have thus treated, has been the expulsion of a dead worm within two hours after taking the remedy, and in one instance the worm was past in fifteen minutes.

"I have had no difficulty in getting the patients to submit to this mode of treatment, nor have they complained of hunger. In order, however, to enable them to bear without much discomfort the prolonged abstinence from solid food, the supply of good beef-tea has, as I have stated, not only been unlimited, but each patient has also been kept in bed during the whole of the treatment.

"The principle of this mode of treatment is, evidently, simply that of emptying the stomach and small intestines by abstaining from all solid food, and by purging; and so, by thus thoroughly uncovering the worm, exposing it to the full and almost immediate action of the remedy.

"I have never, in a single instance, given more than one dose of the drug before the parasite was expelled; nor has the two-drachm dose, given as I have mentioned, caused vomiting or troublesome purging; and in every case the worm was passed dead, and generally in one unbroken piece. No medicine of any kind is given except that which I have before mentioned; and, in a few hours after the worm is passed, the patients are restored to their ordinary diet.

"Before I was in the habit of preparing patients by the previous purging and abstinence which I have described, I generally found that the oil of male-fern failed as a remedy for the cases under consideration; but since I have adopted the mode

of treatment which I now make public, I can say that I have never known it fail; and I cannot but feel certain that the remedy in question, if given as I have mentioned, will, invariably, first poison, and then quickly dislodge this troublesome parasite from the human body."—*Canada Lancet*, May 15, 1864.

ON SYRUP OF CHLOROFORM.

By Mr. T. B. Groves, F. C. S.

I presume, from the frequency of its use, that chlorodyne is at least a *convenient* preparation. Of its medicinal value I know nothing.

It was in attempting its preparation, with a view of satisfying myself as to its reported difficulty of accomplishment, that I met with the facts forming the purport of this communication.

It has been proved by experiment that chloroform is soluble in water to the extent of 2½ minims only per ounce, and that if a spirituous solution of chloroform containing a larger proportion than the above be added to water, the excess of chloroform soon finds its way to the bottom of the liquid, with which no amount of shaking will cause it to mingle sufficiently well to enable the dose to be accurately apportioned. This difficulty has been sought to be remedied in various ways. A Frenchman proposed a syrup of chloroform and glycerine, which he reported to have a marvellous aptitude to combine with water without decomposition. Mr. Squire, however, disposed of that fallacy as soon as it appeared.

Another form, also from a foreign source, consists of $\frac{1}{100}$ of chloroform dissolved in oil and then emulsed with gum and syrups—probably a good form for sole administration, but ill adapted for combinations.

It occurred to me that if chloroform were reduced to exactly the same specific gravity as the syrup employed, by the addition of a liquid lighter than itself, mixture once effected would be permanent; there could apparently be no tendency to separation if the theory admitted of being practically carried out. It was also obviously a *sine qua non* that the lighter liquid should not be liable to be abstracted by the syrup, or the chloroform would inevitably be precipitated in the globular form, as in the case of chloric ether.

I have succeeded in making such a mixture by reducing the specific gravity of the chloroform by means of ether, and shaking them with a definite amount of syrup. The chloroform manifests no tendency to separation, even when present in the proportion of one-eighth, but a better form is that containing one-twelfth.

The *modus operandi* is as follows:—Put into a twelve ounce bottle one ounce of chloroform and about three drachms of ether; to the mixture add the same volume of the syrup to be employed; observe carefully the disposition of the fluids, the chloroform and ether will probably sink, then add *guttatim* more ether until the two liquids, on being shaken together, appear indifferent as to their position in the system; finally fill up the bottle with the syrup, and shake well for a minute or two.

The syrup should not be too dense, or it will be difficult to impart to it sufficient agitation to ensure the complete commixture of the fluids. The syrup should be composed of gum and sugar, of honey or treacle; syrup of sugar does not answer well, apparently on account of lacking viscosity.

The syrup thus formed has the same physical properties as chlorodyne, and, like it, is readily miscible with water in any reasonable proportion (one to seven), and soluble in the water where the proportion of chloroform is within the limits of its solubility.

The advantages attending its use are these:—1st. It does not need special precaution when being added to watery fluids, it being at once diffused completely, and in no case does it give rise to a deposition of large globules of chloroform. 2d. When added in excess of saturation, the undissolved chloroform is deposited in *very minute globules*, which, after lying together for days, show no disposition to combine, but may by a few shakes be dispersed evenly through the liquid, forming an emulsion sufficiently permanent to enable a dose to be measured without difficulty.

I will conclude by proposing the following form for an anodyne containing chloroform (founded on one published by Dr.

Ogden), which will be found to remain combined and to mix readily with either spirit or water:

Take of Chloroform ʒiv.
Ether ʒiss.
Oil of Peppermint gtt. viij.
Resin of Cannabis gr. xvj.
Capsicum gr. ij.

Macerate for two or three days and filter. (No. 1).

Then take of Muriate of Morphia gr. xvj.
Hydrocyanic Acid Sch. ℥ xcvj.
Perchloric Acid.
Water *aa* ʒss.
Syrup of treacle (or honey), to make in all 4 oz.

Dissolve the muriate of morphia in about an ounce of syrup, to which has been added the perchloric acid and water, assisting solution by a water-bath, and when cold add the prussic acid.

Here, as it is absolutely necessary to preserve the relative proportions of these potent medicines, and also to include them in a given bulk, the manipulation is not so easy. It is only to be done, so it appears to me, by balancing separately the chloroformic tincture with the morphia syrup, and then again with a plain syrup to be used in making up the exact measure of the completed article. The balancing must be effected by adding water *guttatim* to a syrup denser than necessary. Then having ascertained by the balance the proportions required, quantities of the *same* materials, no matter how great, can at once be adapted for use without further trouble.

My chief object in giving the details of this process is to enable prescribers to devise for themselves, if they think fit, a form of the *exact* composition of which they are aware—an all-important requirement, one would imagine, where remedies of great potency are to be administered.—*London Pharm. Journ.*, June 1, 1864.

RESTORATION OF PICTURES.

Professor Pettenkofer, of Munich, who, it may be remembered, has invented a method for restoring pictures, has just

patented his invention in this country. The nature of the process, which has been for some time an object of much speculation, is extremely simple, and is mechanical, not chemical. The change which takes place in pictures, he says, is "the discontinuance of molecular cohesion," which "process begins on the surface with microscopical fissures in the varnish, and penetrates by-and-by through the different coats of colors to the very foundation. The surface and body of such a picture become, in the course of time, intimately mixed with air, and reflect light like powdered glass, or loses its transparency like oil intimately mixed with water or air." The process consists in causing these molecules to re-unite, which he does as follows: The picture is exposed in a flat case, lined with metal, to an atmosphere saturated with vapor of alcohol at the ordinary temperature, which vapor is absorbed by the resinous particles of the picture to the point of saturation. The different separated molecules thus "re-acquire cohesion with each other, and the optical effect of the original is restored solely by self-action, the picture not getting touched at all." Other substances besides alcohol—such as wood-naphtha, ether, sulphuric and other ethers, turpentine, petroleum, benzine, &c.—may be used. The process seems to have been very successful at Munich, where Professor Pettenkofer restored some almost invisible pictures to very nearly their original freshness. Liebig has reported favorably on the method, and has given it as his opinion that it cannot injure the paintings, which, indeed, is almost a consequence of its extremely simple nature.—*Chem. News*, (London), June 18, 1864, from the *Reader*.

NOTE ON DISTILLED SULPHURIC ACID.

By Prof. Redwood.

The sulphuric acid of the British Pharmacopœia differs from that hitherto used in medicine in this country. We have been accustomed under the name of sulphuric acid to use commercial oil of vitriol, and this, according to the last London Pharmacopœia, was to have a specific gravity of 1·843. We are now directed in the British Pharmacopœia to use, not commercial

oil of vitriol, but distilled sulphuric acid, and this is described as monohydrated sulphuric acid (HO,SO_3), the specific gravity of which is represented as 1·846.

Having had occasion in my lectures on the British Pharmacopœia to remark, with reference to sulphuric acid, that in the processes and descriptions given in that work there are some inconsistencies and errors, I have been called to account for making such a statement on what has been assumed to be insufficient grounds.

The subject is one on which I had worked a good deal some years ago, and my remarks were partly founded on results then obtained, and partly on the published investigations of others. I have since repeated some of the experiments to which I referred, and wish on one or two points to lay the results before the meeting.

Forty-eight fluid-ounces of commercial oil of vitriol, of sp. gr. 1843, were put into a small platinum still with one ounce of sulphate of ammonia, and the mixture submitted to fractional distillation. The first distillate, consisting of seven fluid ounces, was rejected. The three subsequent distilates, consisting of three fluid ounces, five and a half fluid ounces, and six and a half fluid ounces, had all very nearly the same specific gravity, ranging from 1841·3 to 1841·5. The next distillate, consisting of seven and a half fluid ounces, had a sp. gr. 1842·3, and the next, consisting of six fluid ounces, had a sp. gr. 1842·5. I observed that all these products had a slight smell of sulphurous acid, the production of which I could only account for by assuming that a portion of the sulphuric acid was decomposed in contact with the heated platinum vessel at the temperature required for the distillation. I ascribed to this decomposition the low specific gravity of the product as compared with what is indicated in the Pharmacopœia, and I therefore relinquished the further use of the platinum still.

Another operation was performed in a glass retort, as described in the Pharmacopœia. The specific gravity of the oil of vitriol operated upon in this case was 1844, this being the densest commercial oil of vitriol I was able to get. The pro-

cess was conducted strictly according to the Pharmacopœia, the first ten fluid drachms being rejected, and then the product collected until one fluid ounce was left in the retort.

The distillate in this case was free from any smell of sulphurous acid. Its specific gravity was 1843. One fluid drachm (100·8 grains) of this acid was neutralized by 202 measures of the volumetric solution of soda, indicating that it contained more than one atom of water to the atom of anhydrous acid.—*London Pharm. Journ.*, June 1, 1864.

ON *MYROXYLON TOLUIFERUM*, AND THE MODE OF PROCURING THE BALSAM OF TOLU.

By John Weir.

Extracted from the Proceedings of the Royal Horticultural Society for May, 1864.

[Previous to his departure for New Grenada, Mr. Weir received instructions to make inquiries respecting certain interesting medicinal plants growing in that country, especially the *Balsam of Tolu* tree and *Sarsaparilla*, and to obtain, if possible, seeds and specimens. In accordance with these instructions, Mr. Weir has communicated the following interesting notice of his proceedings.]

From inquiries made during the voyage out, and immediately on landing in this country, I learn that a good deal of the Balsam of Tolu was brought down the river Magdalena annually to Barranquilla, whence it is exported to Europe. I therefore thought that the best way of reaching the country where the tree grows, was to go up the river to one of the ports I was informed the drug came from, where I hoped to be able to procure specimens and collect the desired information concerning it. At all events, I was told that by going to one of the ports on the lower Magdalena, I could cross the country to the valley of the Zinú quite as easily as I could reach the mouth of that river from Cartagena by sea.

Following up this plan, I took a passage to Mompox by the first steamer up the river, after my arrival at Barranquilla. On arriving at Mompox, I found that no balsam was gathered there (although I had been assured to the contrary in Barranquilla), and that the people generally did not know the tree; a negro

was recommended to me, however, as having a wonderful knowledge of all kinds of "*hervas y remedios*," and who said he knew where some of the balsam-trees grew. With this man I started in a canoe for a place called Espiño, about three leagues distant from Mompox, and situated on the margin of one of the large swamps called "*ceinigas*," so common on the lower part of the river.

On reaching this place we entered the forest; and after having toiled through it for a couple of hours, during which I was gradually losing faith in the probity of my guide, he suddenly pointed out a tree which he assured me was the balsam-tree. This confirmed the opinion I had been forming—that he knew nothing about it, for the tree was certainly not a *Myroxylon*, nor anything like one.

I returned to Mompox in disgust. The gentleman who recommended the black was much disappointed on learning the result of our excursion, but said he had found another man, who would undertake to guide me to a place where the tree was to be found. I went with him a few days afterwards, but with no better success.

I have no doubt that the tree occurs within perhaps a day's journey of Mompox, but not in its immediate vicinity; for the ground, for leagues around that place, is low and swampy; indeed, it was nearly all under water when I arrived there, and I afterwards found that the tree is never found in the low tracks adjoining the river, but in the higher rolling ground beyond, where the soil is dry.

Finding that the tree was not known in Mompox, I left for Plato on the 17th December. Taking the steamer to Las Mercedes, I went from thence to Plato in a canoe. Las Mercedes is the port of El Carmen, and it consists only of a large storehouse for the tobacco brought from the interior, and the imported goods received in exchange. It was here I first saw the balsam. In the store were upwards of thirty tins full of it, ready for exportation; most of the tins contained ten pounds of the balsam, but there were also a few of a larger size, each containing an arroba of twenty-five pounds. The store-keeper told me that that lot of balsam had come from Plato only a day or two before, and that he expected some more

that evening from the same place. The drug, he further informed me, was also exported from Teneriffe, Pinto, and Santa Anna, all small ports on the right bank of the river, but that most came from Plato. At Corozal, he said, none was now gathered, although the tree exists there, as also at El Carmen.

I was glad to find that I had got on the right track at last, and waited patiently for the canoe from Plato, by which I hoped to get a passage to that place. It arrived about six o'clock in the evening, started on its return an hour later, and by nine of the same day that I left Mompox, we were in Plato. This place is about a league further down the river than Las Mercedes, and on its opposide side, near the outlet of one of the numerous branch-streams the river forms in its course. Luckily for me, the "Jefe Municipale" of Plato, Frederico Alfaro by name, came in the canoe with me, and this man showed me much disinterested kindness during my stay there.

I had great difficulty in getting animals for the journey into the Montaña,—not a horse nor a mule was to be had, and it was only after waiting two days that I was able to hire two donkeys, one for my guide and the other for myself; a third for baggage I could not get,—and, indeed, it was considered quite unnecessary, as it is the usual custom here to travel on donkeys loaded with 80 or 90 lbs. of cargo besides the rider.

During the two days I had to wait at Plato, I found a species of *Myrospermum* growing plentifully in the neighborhood of the village, and gathered specimens of it both in flower and fruit. This I take to be *M. frutescens*, Jacq.: it grows to a height of about 15 or 20 feet. Some trees are now in flower, while on others the fruit is already of a good size. The trees bearing flowers or fruit are generally destitute of foliage, and it is only barren individuals that are in full leaf.

On the morning of the 21st, having got the donkeys and guide assembled and everything ready, we started for the Montaña. On one side of my own donkey was hung a bundle of paper and boards for drying specimens, and on the other my "estéra" (mat for sleeping on), blankets, mosquito net, and a for the journey and his own things. I started on foot, feeling change of clothes; that of the guide carried some provisions

almost ashamed to mount an animal not much bigger than myself, which seemed to be already well loaded, but, before the day's journey was done, I had been glad to take occasional lifts on the poor donkey. We made about eighteen miles before we halted for the night, and my guide, a man twice my weight, rode every foot of the way. What with the burning sun, the thermometer at 89° in the shade, and the heavy load, I did not much envy his poor "burro."

We passed some balsam-trees in the afternoon, each with a lot of calabashes stuck on its trunk to catch the drug which trickled from the wounds in its bark. I picked up a few of the fruit under one of these trees, and on asking him what they were, he said they were "ojos de algo palo de la montaña." He did not know them, although he told me he had been accustomed to gather balsam since his boyhood.

Our second day's journey was not so long as the first,—I think not more than about twelve miles. The balsam-trees occurred occasionally during the whole way. We stopped at a hut in the forest surrounded by a small clearing, the owner of which, like all the inhabitants of the Montaña, makes part of his living by gathering balsam. The trees were very plentiful here, and generally of a large size. Their average height is about 70 feet, and the trunk is sometimes upwards of two feet in diameter a yard from the ground, and generally rises to a height of forty feet without branching, so that it is impossible to get at either foliage or fruit without cutting down the tree. On the day after our arrival, I got the man's permission to have a tree felled; he did not charge me anything for the tree, but stipulated that I should pay two of his sons a dollar each for felling it. I selected an old tree, nearly 2 feet in diameter. There was a sprinkling of pods upon it, but it was not by any means loaded. The pods are so loosely attached to the branches and so brittle in themselves, that nearly all of them were shaken from the tree and many broken to pieces by the shock of the fall. I found them to be approaching maturity, the seeds being fully developed, but, I am afraid, not ripe enough to grow. I had another smaller and more vigorous tree cut; the foliage of this was much larger than that of the older tree, and also a little different in form, but it bore no fruit. The

specimens I send will sufficiently show the difference in the foliage of the two trees, and it is also sufficiently explained by the greater luxuriance of the younger.

As I have already said, it is impossible to reach the foliage of any of the trees unless by felling them; but I examined the leaflets of many trees from specimens picked up from the ground, but saw nothing to induce me to believe that the balsam is produced here by more than one species. The young trees have always larger foliage than the old ones; but the difference was constantly the same as it was in the individuals I had felled. The trees never make a very dense head of branches and foliage; but in the old ones, which have been much bled, it is very thin: many of the small twigs are dead, and the living ones are covered with lichens.

When a tree is about to be bled, two sloping notches are made in its trunk quite through the bark, and meeting in a sharp angle at their lower ends, leaving thus a point of bark between them untouched. The bark and wood is hollowed out a little immediately under this point, and the calabash cup is inserted under it. The process is repeated all over the trunk at close intervals, up as high as a man can reach; I have seen as many as twenty cups on a tree. The piece of bark and the cups I have sent, will show the process better than I can describe it. When the lower part of the trunk of a tree is too full of scars and wounds for any fresh cuts to be made, a rude scaffold is sometimes made round the tree, and a new series of notches made higher up.

From time to time, as may be necessary, the balsam gatherer goes round the trees with a pair of flask-shaped bags made of raw hide, slung over the back of a donkey. Into these bags the contents of the calabash cups are successively poured, and the cups are reinserted under the point of bark and left to be again filled. The balsam is sent down to the ports on the river in these hide bags, where it is transferred to the tins.

I could not learn which were the best months for the flowing of the balsam,—one person saying that it was in July, another in March, and so on, scarcely two agreeing; but the bleeding goes on during at least eight months of the year, from July to

March or April. When the balsam is flowing well, I was told that "one moon" sufficed to fill the cups.

Respecting the time of the flowering of the tree, individuals differed as widely as they did about the best time for the production of the balsam. I think I was told that it flowered in every month of the year, each person asked giving a different month; and several asserted that it did not flower at all.

I could not get any one to recognize the name "*Balsamo de concolito.*" I tried individuals with it at Cartagena, Barranquilla, Mompox, Las Mercedes, Plato, and the Montaña, but none of them knew what I meant. The balsam is certainly not known by that name at any of these places, but is always called *Balsamo de Tolu.**

I remained a couple of days in the Montaña, and returned to Plato. We travelled part of the way with a man going down to the port with a quantity of balsam: he had three donkeys loaded with it, each carrying four arrobas, or 100 lbs. weight. The quantities of the drug I saw on its way for exportation at Las Mercedes, Plato, and on the road from the Montaña, must have amounted to at least 1,500 lbs., which proves that the tree must be very plentifully scattered through the forest.

I returned to Mompox in a canoe, and arrived there on the 29th ult. On the 4th of the present month I left Mompox by the steamer up the river, and landed here on the 7th. This place is called Barranca Varmeija, and is situated on the river side, about two leagues further up than the place where the village of Bojorques formerly stood, for it is not now in existence, the river having carried all the houses away. This being the nearest point to Bojorques I could land at, I came here hoping to find *Smilax officinalis* H. B. K., but after several days' unsuccessful searching for it, I am afraid I must conclude it is not here; but I will go to Bojorques in another day or two, and perhaps I may find it there.

The Rhatany, I was told at Barranquilla, came from the neighborhood of Bucaramanga, and as I intend to go up the

* "The balsam is not distinguished in this region [Carthagena] by the name of *Tolu*, but is known by the name of *Balsamo de concolito*,—*concolito* being the native name of the small calabash used for collecting it." —*Letter from the late Sutton Hayes to D. Hanbury, April 23d*, 1862.

river Sogamoza to that place when I leave Bojorques, I hope to be able to procure specimens of the plant that produces it there. —*Lond. Pharm. Journal, Aug.* 1, 1864.

Barranca Vermeija, on the River Magdalena, New Grenada, January 13th, 1864.

POISONING BY DIGITALINE.

A very remarkable trial has lately taken place at Paris, in which a homœpathic physician, named La Pommerais, was charged with having poisoned a poor widow named Pauw, whom he had known for many years, and had attended her husband before his death, after which she became his mistress; and this connection continued till 1861, when it was broken off in consequence of Pommerais marrying a Madlle. Dubizy. The intimacy was renewed in July last, when he suggested that she should insure her life for £22,000, and that after the payment of the first premiums she should simulate illness, and then make a proposal to the insurance companies that her policies should be exchanged for a life annuity. The policies were effected in July for the above amount, at annual premiums of £750, and on the morning of the 17th of November the widow Pauw was found in great agony, and died in the evening. Dr. Gaudenat, who had been in attendance, certified that death was caused by a fall three months previously. Pommerais afterwards applied to the companies for payment of the money due upon the policies; but suspicions having arisen, a *post-mortem* examination was ordered, and hence the present trial. The *post-mortem* examination was made by MM. Tardieu and Roussin. No poison was discovered in the viscera, but there was an absence of disease in the internal organs. However, from the symptoms exhibited before death, and from experiments made on animals with the vomited matters scraped from the floor of the room occupied by the deceased, and with the contents of the stomach, they were of opinion that death had resulted from some powerful poison, probably digitaline. On the other side, it was contended that the experiments made with the matter scraped from the floor of the room were valueless, as it is impossible to say that organic matter in a state of decomposition

might not have been sufficiently poisonous to cause the effects described. MM. Claude Barnard, Valpine, and Raynal were examined as to the action of digitaline on the heart, and described the experiments they had made with that substance. The jury found the prisoner guilty of poisoning the widow De Pauw. No mention of extenuating circumstances having been made, La Pommerais was condemned to death, and has since suffered the penalty.—*Lond. Pharm. Jour., July*, 1864

ORIGIN OF GRAPHITE.

Report of M. Haidinger and others.

Iron, after remaining long buried in the earth, at last entirely decomposes, leaving a black, porous, eminently combustible residuum, known as graphite or pure carbon. M. Haidinger's report on the ferruginous masses of Kokitzan and Gotta, near Dresden, masses of uncertain origin, lends support to this general fact.

One word on the formation, still so little known, of graphite (plumbago pencil lead). The presence of graphite in granite gneiss and diorite, has renewed the disputes between the Neptunists and Plutonists. Graphite is well known to be nearly pure carbon, for it leaves in burning but a very small quantity of ash. Now, if these primitive crystalline rocks are of igneous formation, it is impossible to explain how graphite could co-exist with silicates of protoxide of iron without having reduced these salts. Judging merely by what takes place in blast furnaces, carbon reduces all oxides of iron at a high temperature. It must, then, be admitted that granite, gneiss and diorite did not contain graphite when the mineral elements of these rocks, such as mica, hornblende, and other ferrous silicates were in a state of fusion. Graphite, then must have been subsequently introduced into these rocks—but when, and how? Questions such as these are very difficult to answer satisfactorily. The most plausible hypothesis is that graphite has been introduced by the wet way into the crystalline rocks and substituted for one of the mineral components. Thus, in the gneiss of Passau (Bavaria), it takes the place of mica.

Graphite is frequently to be met with in granulated lime-

stone—a fact particularly interesting to geologists. Is limestone a product of eruption, or is it a sediment transformed by the action of heat? The presence of graphite is explicable by neither hypothesis. For at a certain temperature, which need not be very high, carbon decomposes carbonate of lime. This salt may no doubt, under strong pressure, be heated to the melting point without losing its carbonic acid; this is a laboratory experiment often cited by the Plutonists. But it is quite a different thing with a mixture of carbon and carbonate of lime at a high temperature. If we reject the Neptunian origin of granulated limestone, we must then, as with crystalline rocks, suppose that graphite has been introduced by the wet way at a more recent period. The same remark applies to magnetic pyrites (sulphide of iron), often very rich in plumbago kerns.

Does graphite, like all carbon, belong to the organic kingdom? It is certain that anthracite, lignite, coal, are the result of the slow decomposition of an enormous quantity of vegetables; the impressions found on them often indicate the kind of vegetables, most of them extinct, which have contributed to these carbonaceous formations. Graphite, if not formed in precisely the same way as coal and anthracite, nevertheless bears signs of an organic origin. The formation of nuclei and veins of graphite in crystalline rocks is sufficiently explained by the decomposition of carbonized hydrogen gas at a high temperature; this gas, disengaged from organic matters, and penetrating the fissures of the burning rock, would undergo decomposition into hydrogen and carbon.

It is this deposited carbon which forms graphite. If in our laboratories we do not obtain exactly the same product, it must be remembered that Nature has means at her command which escape our researches. We find it impossible to make coal from wood. The wood may be carbonized by the dry or by the wet way. In the first place the carbonization is very rapid; in the latter it is extremely slow, as is shown by the blackened points of piling sunk in water.

Finally, graphite has been found in meteorites or areolites. Attempts have been made to explain its presence here by the continuance of these stones in soil more or less rich in carbonized principles. But with regard to newly-fallen stones, this

explanation is inadmissible. If it be maintained that graphite is an organic product, it must be admitted that in the case of newly-fallen meteorites it can proceed only from organic matters belonging to another world than our own.

In his report on Alibert graphite, M. Dumas presents some considerations on the probable origin of graphite and of the diamond. M. Despretz and others ascribe to fire the change of carbon into diamond; Newton ascribed it to the coagulation of a fatty or oily body; Liebig says the diamond is slowly formed by processes which determine the prolonged putrefaction of a liquid body rich in carbon and in water; then, contrary to M. Despretz's method, a high temperature would be unfavorable to a successful attempt. Adopting Newton's hypothesis, M. Gœppert states, in "a memoir on the solid bodies entering into the composition of the diamond, and considered with regard to their organic or inorganic origin," that he is disposed to class the diamond among the products of the decomposition of organic matters. All these hypotheses M. Dumas rejects; according to him the diamond is crystallized carbon, at the moment of its production and in the midst of a mass which has been exposed merely to the heat necessary to soften it, provided this condition is sufficiently prolonged.

Finally, M. Dumas frankly admits that nothing positive is known as to the true origin of the diamond, though the substance most allied to it, silicum, is perfectly known, and very beautiful specimens of it are obtained.

However, it is positively ascertained that the diamond and graphite have not the same origin, and that the residue of every carboniferous substance, treated at a high temperature, proves to be but a variety of graphite. The new carbon found by M. Alibert in the mines of Marinski, situated at the summit of Batougol, on the Siberian frontiers, is, then, a graphitoid carbon of the most beautiful kind, formed by volcanic phenomena. M. Jaquelain, after carefully comparing the external characteristics of Alibert graphite with that obtained by his process, concludes that the conditions under which they are produced must be analogous.

In fact, on comparing the texture of the two carbons, they will be found sometimes of a metallic, mirror-like lustre; at

another time the surface will be of shining steel-grey, mammilated as if it had been half fused, and had passed through a pasty stage. This appearance is similar to that of oxide of iron, nodulous brilliant, with mammilated surface, known by the name of brown hematite.

M. Jaquelain is inclined to admit that tarry and pyrogenated products, transformed in immense proportions into carbon and hydrogen, under the influence of igneous rocks, become accumulated in rents and excavations, causing an aggregation of carbon, and inducing a fusion analogous to that of carbon in retorts for lighting gas, and of graphitoid carbon destined to form the pencils used for the electric light.

On this point, M. Jaquelain narrates one of his own recent experiments. On decomposing some sulphide of carbon in a porcelain tube in presence of pure copper, heated to about 300°, sulphite of copper and graphite were formed, externally similar to natural graphite.—*Lond. Chem. News*, from *Cosmos*, pp. 720—725, 1864.

POISONOUS EFFECTS OF OIDIUM OF VINES.

We all know the destruction which the *oïdium* has caused among the vines for many years past, and, according to a communication made by M. Collin to the Academy of Medicine, it may determine in man all the symptoms of true poisoning. In the three cases which he relates, the persons while cutting vines affected with *oïdium* produced a slight incision of the skin; and in all the same symptoms resulted. In a few days, shivering, loss of appetite, and fever with remissions set in. The cut, at first quite insignificant, soon assumed a bad aspect, and eventually became gangrenous, the limb itself being œdematous, The most remarkable circumstance was that the mouth became covered with *muguet*, which modern researches have shown to be a cryptogamous production, and which has, indeed, been termed by M. Gubler the *oïdium* of the mouth. M. Collin has instituted some experiments by the inoculation of animals with *oïdium*, the results of which will be communicated.—*Med. News*, from *Med. Times and Gaz.*, April 23, 1864.

A NEW METHOD OF PRODUCING ALDEHYDES.

By M. Carstanjin.

The different processes for preparing aldehydes consist essentially in—

1st. The oxidation of alcohols.

2d. The oxidation of nitrogenised matters, such as albumen, gelatine, &c.

3d. The dry distillation of salts from fatty acids.

4th. The same distillation conducted with that of the formiates of lime and baryta.

5th. The distillation of albuminoid substances.

6th. The dehydration of glycols.

On the strength of several observations, the author thinks himself justified in laying it down as a general fact that an aldehyde is always to be obtained by submitting an ammoniacal base to a proper oxidation. Among them is the acetic aldehyde $C_4H_4O_2$ rapidly developed when ethylamine is poured on crystallized permanganate of potash. At first violet, the liquid turns green, develops heat on shaking, becomes brown with effervescence, and finally evolves the aldehyde, so perceptible by its odor. The gas of the reaction passed into an ammoniacal solution of silver, promptly reduces it, forming a metallic silver mirror.

With methylamine he has obtained a strongly reducing gaseous compound like the above, and, like it, capable of forming a crystalline compound with ammonia. He has not analysed it, but believes it to be the hitherto unfound aldehyde of methyle.

With trimethylamine a compound is produced which the author believes to be identical or isomeric with propylamine.—*Chem. News, London, June* 4, 1864, from *Journal de Pharm. et de Chimie.*

NOTICE.

American Pharmaceutical Association.

The Twelfth Annual Meeting of the American Pharmaceutical Association will be held in the city of Cincinnati, Ohio, on Wednesday, the 21st day of September, 1864, at 3 o'clock, P. M.

The objects of the Association should by this time be well known to all Pharmaceutists, and are fully explained in the 1st Article of the Constitution, and conditions of membership in Article 2d.

From the well known character of the Chairmen of the various Standing Committees, able and interesting reports may be expected, and it is hoped that the attendance of the members and others interested in its objects will be large..

J. FARIS MOORE, *President.*

Baltimore, Aug. 10th, 1864.

Editorial Department.

MEETING OF THE ASSOCIATION—By the official notice above our readers will be reminded that the American Pharmaceutical Association will hold its Twelfth Annual Meeting at Cincinnati, Ohio, on the 21st of September, at 3 o'clock, P. M. In order to facilitate the Convention, we telegraphed to Cincinnati to get the location of the meeting in that city, and are informed by Mr. Wayne that the Committee have selected the Catholic Institute, on Vine street below Sixth, as being near the Hotels. Strangers, by applying at Mr. Gordon's store, at Central Avenue and 8th street, may get information relative to the meeting, and parcels or documents intended for the meeting will reach their destination directed to the President of the Amer. Pharm. Association, care of W. J. M. GORDON, as above. We are pleased to hear of the expected attendance of a number of prominent members from the Atlantic States, and, with some earnestness of purpose on the side of our western friends, the meeting may prove a decided success.

BRITISH PHARMACEUTICAL CONFERENCE.—The Second Annual Meeting of this body will convene in the City of Bath, England, on the 14th of

September, (the same time and place with the British Association for the Advancement of Science, which commences its sittings on the 13th). Many of our readers will recollect that this body commenced its existence last year at New-Castle-upon-Tyne, in an endeavor on the part of several of the prominent Pharmaceutists of England to modify the existing relations between the pharmaceutical chemists and the chemists and druggists of that country, so as eventually to have but a single class. Some of those who sought this object believed that the tendency to centralization in the action of the Pharmaceutical Society, would be counteracted by having an Annual Meeting for scientific and professional purposes, which should be migratory in its character and which should be untrammelled by the material requisites of a local society. In fact, in many of its features the "Conference" is like our Association, and affords, like it, a middle ground where all interested in pharmacy may meet on equal terms and under circumstances eminently calculated to develope the professional feeling and talents of the members. Last year a series of subjects were accepted by members to be reported on at the ensuing meeting, and if only one half of them are acted upon, the profession must certainly be benefitted by the results. The "Conference" has our best wishes for a successful meeting and a continued existence of usefulness.

The Eighth French Pharmaceutical Congress was to have met on the 17th, 18th and 19th of August, at Strasburgh on the Rhine. The French Journals, in giving the notice of the meeting, state that the Railroad Companies have reduced the fare, for members in attendance for the occasion, to fifty per cent. of the normal charge. This is an arrangement that would add many members to our Cincinnati meeting, if it could be carried out with the Railroads here. We hope in due time to be able to chronicle some of the proceedings of this scientific body.

Bronze Statue of Vauquelin.—A movement is on foot at Paris to erect a bronze statue in honor of this eminent chemist, who was so closely connected with the progress of chemical science in France. The Committee embraces the names of Dumas, *Chairman*, Boullay, Frémy, Pelouze, Bussy, Guibourt, and many others; Guibourt acting as Treasurer. From the energy exhibited in bringing the subject to the attention of pharmaciens it is highly probable that the measure will be carried into effect.

The Schools of Pharmacy.—The season for special devotion to pharmaceutical study is rapidly approaching, and students begin to prepare the way for attendance at one or other of the Schools of Pharmacy. The attention of such and others is directed to the advertising sheet of this number for advertisements of the Schools.

CHLORODYNE. *Davenporte* vs. *Freeman.*—This empyrical preparation, which has been some years before the public, and a formula for which was copied into this Journal at vol. viii. page 181, has recently been the subject of litigation in London, where two persons claim the right of making the original Chlorodyne. The case was tried before Vice-Chancellor Sir W. Page Wood, on the 8th of July, and occupied three days. From the evidence it would appear that the recipe originated, so far as first bringing it before the public as invented by Dr. J. Collis Browne, by the plaintiff, Mr. Davenporte, whilst the defendant, Mr. Freeman, claims to have invented it before Browne, though he did not make it public, and hence felt entitled to use the prefix "original" as a trade mark. Neither party claim any patent right, and after a tedious hearing of evidence, the Chancellor decided to dismiss the bill, remarking that he considered the plaintiff as the original and true inventor of the compound, and reflected unfavorably on the unscrupulous conduct of the defendant and disapproved of his course. The whole affair reminds us of a similar case that occurred some years ago in this country, noted for its lucrative results to the lawyers; and when it is considered that the final question is merely whether the public shall be the more fleeced by Davenporte or by Freeman, in the sale of a nostrum, which no one can make by the published formula, there need be no regret at the result.

Memoranda on Poisons. By Thomas Hawkes Tanner, M. D., F. L. S., Assistant Physician for the diseases of women and children to Kings College Hospital, etc. From the last London Edition. Phila., Lindsay & Blakiston, 1864; pp. 112, 24mo.

This little volume, which may be carried in the pocket without inconvenience, embraces much information valuable to the practitioner in emergencies, and so condensed, clear, and well arranged, as to be capable of rapid and easy consultation. About two-thirds of the book is devoted to the mineral poisons and the balance to organic poisons. The latter are treated of in greater variety than is usual in so small a work, as opium, prussic acid, chloroform, ether, alcohol, hyoscyamus, narcotic gases, strychnia, and strychnic drugs, belladonna, aconite, colchicum, digitalis, lobelia, ergot, conium, picrotoxin, and the bites of venomous reptiles.

The symptoms, treatment and postmortem appearances are given. Cases are occasionally introduced to illustrate the effects or the treatment. Although intended mainly for the physician, we believe this little book will prove useful to the apothecary, and should be kept on his shelf.

First Outlines of a Dictionary of Solubilities of Chemical Substances. By Frank H. Storer. Cambridge. Lever & Francis. 1864. *Part Third. Pp.* 256. *Royal octavo.*

It is with pleasure we receive the Third and concluding part of this

valuable work from the publishers through the hands of Messrs. J. B. Lippincott & Co., of Philadelphia. We have already noticed the other two portions of this work, at pages 189 and 573 of the volume for 1863. This part includes the last portion of the extensive subject of metallic oxides proper, and continues to zirconium. Among the pharmaceutical subjects that particularly strike the reader are palmitin, paraffin, paratartaric acid, pectic acid, perchloric acid, phosphoric acid and the phosphates, phosphorus, picric acid and the picrates, picrotoxin, piperin, quinia, resins in great variety, salicin, sanguinarina, santonin, saponin, silicate of soda, starch, stearic acid, succinic acid, sugar, sulphuric acid, and the sulphates, the sulphites, sulphur, tartaric acid and the tartrates, valerianic acid, and the valerates. So far as examined, the author appears to have extended the same care to this part as to the others, and now that the work is completed, the whole forms a complete body of information in regard to solubilities nowhere else accessible to the chemist and apothecary in so compact and well arranged a form. Guelin's Handbook embraces a large portion of the facts of Storer; yet distributed over fifteen large volumes and without any key of arrangement, the facts are often inaccessible to even the possessor of the volumes. In adopting the title, "First Outlines," the author must have been fully aware of the difficulties of the task he had assumed, and that with all the labor he could put upon it, the result would, in numerous instances, necessarily be but an outline, owing to the lack of observations, or of observations sufficiently definite to afford positive information to the seeker. We believe, however, it was good policy in the author to include every substance he could find recorded, whether its solubility was known or not; so that in future revisions of his work, he can fill in new facts, the need of which he will be reminded by the unfilled blanks. In concluding this brief notice, we can repeat with pleasure what we have stated before, that Mr. Storer's work will prove very valuable to the apothecary and to the manufacturing chemist, who will find frequent need of it, and it should find a place among the useful works of reference in the shop and laboratory.

Suffolk Gold-mining Company of Colorado; organized 1864 *under the laws of the Commonwealth of Massachusetts.* 100,000 *shares,* $5.00 *each. Works in Gregory District, Gilpin Co., Colorado. Treasurer's Office* 46 *Congress street, Boston.* Boston: 1864; pp. 67, octavo.

The above pamphlet of sixty-seven pages is an elegant specimen of Boston typography. The statements and illustrations of the pamphlet are plausible, and if the Company's metallic lodes prove as substantial as their paper and printing they will reap a rich return from their mining operations.